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A Bi-Monthly Journal of Horticulture in all its Branches.

No. 1.] CALCUTTA. TUESDAY, AUGUST 25, 1865. [VOL II

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THE INDIAN GARDENER—VOL. II.

At the commencement of another volume we desire to acknowledge the very liberal and increasing support accorded to this journal during the first year of its existence. This support, we are glad to say, has far exceeded even our most sanguine expectations, and convinces us that it has fulfilled the object with which it was promoted, and done something towards meeting the want long felt by all lovers of horticulture in this country. If during the year that is past our paper has refreshed any weary brain, has solaced the active man of business, has proved instructive and entertaining to the amateur, and has been accepted as a welcome guest in the homes of those who have already won their spurs in the field of horticulture, we are content,—our labour has not been in vain. There is something a little different between the editors and subscribers of a horticultural journal from that of the majority of newspapers. They have to consider the interests of all kinds of readers, while we only have to think of those pursuits with which we are particularly identified, so that there is a mutual sympathy between us, an interest in one another's welfare, which we feel assured will not only continue but increase.

THE GARDEN.

ITS ARRANGEMENT AND MANAGEMENT.

XIV.

GARDEN ENEMIES.—WEEDS.

Yes, weeds; there are weeds, human and vegetable, and this fact puzzles a great many of us. What is the use of weeds? Why must we have corruption and decay? Why must flesh bring forth worms, and dead wood a fungus? Why, if we do not plant corn, must our ground be encumbered with weeds?

Cobbett once wrote that "ants were pretty subjects for poets, but a very dismal subject for gardeners." And in the outer and natural garden, or in the inner and human garden, weeds are very "dismal subjects." They grow apace; as the crop ripens they ripen; they seed more quickly than the corn; we may bind them up and cast them into the fire, but we only touch the body of the weed. Its revivifying substance escapes us, and, like the down of the thistle, goes flying all abroad into our neighbours' gardens or our own. If they do not propagate over our heads, they do under our feet. Couch-grass has an underground white stem, which you may cut and scarify into small bits, and yet it will grow; and the buttercup, pretty, poetical flower, manages to shoot out a long scion, which, at a certain joint, throws down a root, and so from the parent plant you may get your fifty or sixty plants; for weeds have an amazing fertility. A Milton and a Shakspere leave but one or two children, and no male descendants; but Peter Castaway, who poaches, lounges like a lazybones as he is, and spends his life partly on charity, or in the workhouse or prison, will leave twelve or thirteen sturdy young ruffians, each endowed with his father's proclivities. So the descendants of Adam are

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plagued. We have to go forth and break up the hard earth, and watch our crops ; we have to drain, dress, and nourish the earth before we can get a return; but, as Milton notes, we do not find any lack of weeds—"Thorns also and thistles it shall bring thee forth unbid;"—and if one is not up and out early and late in looking after these weeds, they will master us. One year's seeding, says the proverb, is seven years' weeding. So that we may even work on Sundays at our weeds, and cut them up and remove them even on that day of rest, for such work is one of necessity most truly.

The herb coltsfoot is well known, by name at least, in the advertisements, of those who undertake to make people "cough no more." In England, little golden stars of its flowers dot the banks and edges of ditches during the bright days of March, where the soil is softened and broken by the frost of the past Winter. Every flower head of this weed will produce 150 seeds, and as the roots bear from 12 to 150 flowers, the roots propagate in this way from 1,800 to 22,500 each. The farmer, however, gets rid of this nuisance—for it is a nuisance when out of place —by hoeing ; for not content with its seeds, the coltsfoot also propagates underground. But, in regard to fertility, the common red poppy which dots the ripened corn field, and markes everything look so pretty by contrasting beautifully with the green of the unripe, or harmonising with the rich orange brown of the ripened corn, excels the coltsfoot. A single plant will produce 50,000 seeds ; the common dock will produce 13,000, the camomile 40,600, the May weed 45,000, the burdock 24,000, the sow-thistle 24,000, and the dandelion 2,040, all from single plants. With the latter we find a simple and beautiful provision for spreading the seeds far and wide, and children take advantage of it to blow them away as they ask "what's o'clock?" from the seeding-plant. A light, feathery parachute is formed by a delicate down, as in thistles, groundsel, and other plants ; and attached to this, like a car, is the dark brown seed, balanced by which the little balloon is borne for miles on a brisk gale, and settles down in any cranny of the field, and the plant shoots up with great vigour in the Spring. The hardiness and amazing fecundity of this plant, and of many others, is evidently a wise provision of Providence for the preservation of a useful species against its many enemies ; for dandelion, as most people know, is a sound medicine, and, under the name of French salad, is sold to add a bitter relish to other Spring herbs. Every weed has a cunning virtue in it, and its proper use and beauty in its true place.

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But weeds have also better uses. Perhaps to them we may trace much of the fertility of the earth. Sir John Sinclair has drawn from them a very useful lesson. So far from thinking weeds a "dismal subject for gardeners," as Cobbett said of ants, he says that from the fact that couch-grass and thistles can by no means be extirpated, is to be drawn this reflection, "that Providence could not have better contrived than that exertions should be perpetual, and success be in proportion. Does any one think," he continues, "that our various soils would be or could have been sufficiently pulverised and worked had there been no enemies of this sort to challenge forth our labours? Sterility would have seized upon our lands, which are only continued in a state to bear their rotation of crops by the necessary periodical renewals of their fertility. The weeds of the fields excite emulation among farmers, and foul fields are always a reproach to the occupier. Thus are we compelled by an unseen hand to better habits and a more active industry."

The means by which weeds are propagated are manifold ; first, from the neglect of waste places ; secondly, from allowing weeds to be thrown on dung-heaps for manure, a practice which vivifies them and preserves as well as ripens their seeds ; and thirdly, from sowing the seeds of weeds with the seeds of the seed crop. Let us begin with the last first. One would not suppose that any farmer would be fool enough to sow tares with his wheat. And, by the way, tares intermixed with wheat are weeds ; the true definition of a weed is not that given by Johnson, "a herb noxious or useless." There are many herbs which are noxious, but none which are useless, although we neglect that proper use. Man knows God's works too reverently now to call anything useless. No ; a weed is any plant growing out of place ; a stalk of wheat amongst tulips, a cabbage plant in a bed of mignonette, or a prize turnip in a parterre of roses, is a weed. To return from our digression, one would suppose that farmers carefully abstained from sowing weeds ; but such is not the case. Almost everything in this huge market, the world, is adulterated and sophisticated. We get bread made purposely impure, and the very crushed bone and bone dust with which we manure the land is mixed with foreign and non-fertilising substance by the cheats. Hence, too, something like twenty-five thousand weed seeds are mixed with every bushel of Italian rye-grass, for weed seeds weigh heavier. Clover seed is said to be often sold in a state "in which half the weight is made up of weeds and bits of stone and dirt." In a bushel of Dutch clover-seed 2,768,106 weed seeds were found. In white Dutch clover, said a gentleman, who many years ago read a paper on weeds to the Croydon Farmers' Club, 70,400 weed seeds were found in an imperial pint of seed ; and as twelve pints were sown to an acre, the number of weeds to an acre sown was 844,800, or to a square yard, 174. So even upon the farm, with our agricultural friends, who think townsmen such cheats and themselves so honest, we do not find honesty. The simple farmer, not having examined the seed he has purchased, goes delightedly to work in sowing weeds, which it will take him days and weeks to extirpate.

Professor Asa Gray in "The American Journal of Science and Arts," in discussing this subject, says :—

Why weeds are so pertinacious and aggressive is too large and loose a question, for any herb whatever, when sufficiently aggressive, becomes a weed, and the reasons

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of predominance may be almost as diverse as the weeds themselves. But we may enquire whether weeds have any common characteristic which may give them advantage, and why the greater part of the weeds of the United States, (of Britain to a great extent) and probably of similar temperate countries, should be foreigners.

As to the second question, this is strikingly the case throughout the Atlantic side of temperate North America, in which the weeds have mainly come from Europe; but it is not so west of the Mississippi in the region of prairies and plains; so that the answer we are accustomed to give must be to a great extent the true one, namely, that as the district here in which weeds from the Old World prevail was naturally forest clad, there were few of its native herbs which, if they could bear the exposure at all, were capable of competition on cleared land with emigrants from the Old World. It may be said that these same European weeds, here prepotent, had survived and adapted themselves to the change from forest to cleared land in Europe, and therefore our forest-bred herbs might have done the same thing here. But in the first place the change must have been far more sudden here than in Europe; and in the next place, we suppose that most of the herbs in question never were indigenous to the originally forest-covered regions of the Old World; but rather, as western and northern Europe became agricultural and pastoral, these plants came with the husbandmen and the flocks, or followed them, from the woodless or sparsely wooded regions farther east where they originated. This, however, will not hold for some of them, such as Dandelion, Yarrow, and Ox-eye Daisy. It may be said that our weeds might have come to a considerable extent from the bordering more open districts on the west and south. But there was little opportunity until recently, as the settlement of the country began on the eastern border; yet a certain number of our weeds appear to have been thus derived; for instance, Mollugo verticillata, Erigeron canadense, Xanthium, Ambrosia artemisiæfolia, Verbena hastata, V. urticifolia, &c., Veronica peregrina, Solanum caroliniense, various species of Amaranthus and Euphorbia, Panicum capillare, &c. Of late, and in consequence of increased communication with the Mississippi region and beyond—especially by railroads—other plants are coming into the Eastern States as weeds, step by step, by somewhat rapid strides; such as Dysodia chrysanthemoides, Matricaria discoidea, Artemisia biennis. Fifty years ago Rudbeckia hirta, which flourished from the Alleghanies westward, was unknown farther east. Now, since the last twenty years, it is an abundant and conspicuous weed in grass-fields throughout the Eastern States, having been accidentally disseminated with red Clover seed from the Western States.

In many cases it is easy to explain why a plant, once introduced, should take a strong and persistent hold and spread rapidly. In others we discern nothing in the plant itself which should give it advantage. Lespedeza striata is a small and insignificant annual, with no obvious provision for dissemination. It is a native of China and Japan. In some unexplained way it reached Alabama and Georgia, and was first noticed about thirty-five years ago; it has spread rapidly since, especially over old fields and along road-sides, and it is now very abundant up to Virginia and Tennessee, throughout the middle and upper districts, reaching even to the summits of the mountains of moderate elevation. In the absence of better food it is greedily eaten by cattle and sheep, the voiding by them of undigested seeds must be the means of dissemination; but one cannot well understand why it should spread so widely and rapidly, and take such complete possession of the ground. It is one of the few weeds which are accounted a blessing.

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Editorial Notes.

Trees about a house may be too dense. An Italian proverb says that "where the sun never comes the doctor must."

To bleach leaves, mix one drachm chloride of lime with one pint of water, and add sufficient acetic acid to liberate the chlorine. Steep the leaves about ten minutes, and until they are whitened; remove them on a piece of paper, and wash in clean water.

If all destroying powders have failed to drive away cockroaches, try the following:—a teacup of powdered plaster of Paris, mixed with about double that quantity of oatmeal, and a little sugar. Strew this on the floor and place in the corners frequented by the cockroaches.

Trees and Rain.—In a recent part of the *Comptes Rendus* is a report upon observations which M. Fautrat has made in French forests to determine the influence of trees on the distribution of rain and moisture. He finds that forests receive more rain than open plains, and pines more than leafy trees. Pines retain more than half of the water that falls upon them, while leafy trees allow fifty-eight per cent. to reach the ground soon after its deposit. Pines therefore furnish the best shield against sudden inundations, and the best means for giving freshness and humidity to a climate like that of Algiers.

Reviving Cut Flowers.—Hot water will often revive faded flowers, even when every petal is drooping. Place the stems in a cup of boiling-hot water; leave them in it until each petal has become smoothed out; then cut off the coddled ends and put them into milk-warm water. Coloured flowers revive sooner than those that are of a snowy whiteness, as the latter turn yellow. A cool room is best adapted to keeping flowers fresh. They will wilt quickly in badly-ventilated rooms, especially if filled with Tobacco smoke. Each flower as it fades should be taken away, else it will cause the others to decay.—*Harper's Bazaar.*

A Use for Whiskey at last.—For exterminating mealy bug, a correspondent of "Moore's Rural," recommends common high proof whiskey. With a small soft brush one can soon clean the bugs from 100 plants, no matter how badly infested. Dip the brush into the whiskey, and then let a drop or two fall upon a cluster of mealy bug, and they will disappear. There are some very delicate kinds of plants which the whiskey will injure if used too freely; but there is not much danger in its application to the ordinary kinds cultivated in greenhouses. Notwithstanding this we should not advise anybody to add whiskey to their garden stores, as common alcohol will do as well or better.

The "Whistling" Tree.—In Nubia there are groves of acacia extending over 100 miles square. The most conspicuous species, says Dr. Schweinfurth, is the *Acacia fistula*. Its Arabic name is "soffar," meaning flute or pipe. From the larvæ of insects which have worked their way to the inside, their ivory white shoots are often distorted in form and swollen out at their base into a globular bladder-like gall, about one inch in diameter. After the insect has emerged from a circular hole, this thorn-like shoot becomes a sort of musical instrument, upon which the wind as it plays produces the regular sound of a flute. On this account the natives of the Soudan name it the "whistling tree."

Green Manuring.—Vegetable substances in their green and succulent state are powerful fertilisers when thoroughly incorporated with the soil. A great portion of the bulk of green crops is obtained from atmospheric sources; and after a green crop is ploughed in, the soil necessarily contains more of the organic elements essential to vegetable nutrition than it did before that crop was grown; it is richer, in fact, by the carbon, oxygen, hydrogen, and nitrogen, which the green crop has obtained from sources independent of the soil. In like manner, the crop grown after a green crop has been ploughed in has the advantage of a regular supply of mineral elements, which have been worked up by the roots of the fertilising crop from the soil and subsoil, and which in many instances, owing to their sparing solubility, are with difficulty obtained under ordinary circumstances.—*Morton's Cyclopædia.*

The Value of a Compost-Heap.—The gardener and farmer are not apt to appreciate sufficiently the importance of gathering into heaps vegetable substances of all kinds to convert into manure. *Land and Water*, in calling the attention of its readers to the subject, suggests the following plan for a compost-receptacle. In some convenient place lay down a sound floor of concrete, and have a roof to cover it, but let the sides be open. Upon the floor collect weeds and every other kind of waste vegetable matter, road-scrapings, border-edgings—in fact, the greater the variety and the more of it the better. Keep it moist—not over-wet—and turn it over occasionally; at the same time a little salt may be sprinkled over it with great advantage. When sufficiently decomposed, this will form a most valuable manure, highly rich in nitrogen in such a form as to be readily taken up by the crops. Use the liquid of cattle and the domestic liquid waste from the house, and it will surprise many what a store of good manure will soon accumulate.

One of the prettiest legends of Arabic literature attributes to Mahomet a saying that if a man finds himself with bread in both hands he should exchange one loaf for some flowers of the Narcissus, since that feeds the body indeed, but these the soul. Nothing could be more subtle than this ancient confession of the part that colour and perfume and the eternal freshness of flowers take in the education of the heart. These marvellous flowers that spring in their clean lovely dresses out of the worn face of the dingy world, a miracle of beauty silently performed by Nature every year, bring more of poetic mystery with them than any other of the countless transformations of life that charm and perplex us. They are at once the most evanescent and the most lasting of things, and their rapid death only ensures their resurrection. In all religions they have taken a very intimate place in ceremonial, and no wonder; for, in their constantly reiterated disappearance and return, they are types of all that is most flattering to the anxious spirit of man, and most consoling in the best of creeds. The simplicity and refinement of flowers gives a special distinction to almost every art that touches them.—*Examiner.*

The Value of the Study of Nature.—"God Almighty," said one of the wisest of our race, "first planted a garden. And indeed it is the purest of humane pleasures. It is the greatest refreshment to the spirit of man; without which buildings and pallaces are but grosse handy-works." What sense of beauty, what inspiration of hope, what presence of the softer and nobler emotions of humanity can be expected to spring up within the bosoms of men and women who have been reared, from an unlovely childhood, as exiles and aliens from the face of nature? What gracious influence can smile on a squalid infancy, of which the only dismal play-ground is bounded by the wall and the gutter, in which the earth they tread is divided into court, and alley, and row, varied only by the sullen gloom of palisaded square or the selfish jostle of busy street? How can children reared in the unchanged gaol of a great city, to whose experience land is divided into paths and streets, pavement and mud; sky consists of a few square yards of smoky canopy; and sea or far-stretching area of water are altogether unknown and undreamed of; how can such children, as they grow up from a neglected youth into a dangerous maturity, fail to exact from society some penalty for the loss of all that makes the glory of childhood? —*Builder.*

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ITALY.—When the Apennine and Sabinian Mountain range and its slopes were covered with its natural growth of trees, the now detested Roman Campagnas, which constitute the largest part of the Pontine swamps, were a beautiful section of country. They were then adorned with sumptuous summer residences, villas, parks, flower and fruit gardens of the Roman aristocrats. After the destruction of the forests, the whole region became unhealthy, and almost absolutely uninhabitable on account of the malarious gases emanating from the soil. Formerly, these were absorbed by the leaves of numerous trees; now they fill the air and infect even the very heart of St. Peter's eternal city. Within a few years a portion of these swamps have been planted with eucalyptus trees, and they have had a wonderful effect on the healthfulness of the atmosphere, and people now reside in these parts during the summer, where but a short time ago it was impossible to live. The eucalyptus tree is now being introduced into the feverglades of Florida in order to purify the air in these unhealthy regions of the State.—*Phipps.*

JAPANESE GARDENS.—Judging from a paper read at a recent meeting of the St. Petersburg Society of Gardening, the Japanese must be allowed to have distanced us altogether in at least one branch of education. Enthusiasts in gardening would fain live to see the day when every householder will have his plot of garden and will know how to cultivate it The universal spread of such knowledge seems to be almost as hopeless as the possession of plots for its exercise in our large towns. But the Japanese, M. Grigorieff tells us, are all taught gardening in their schools, and all have their little plots of ground. They are instructed in practical horticulture and in the artistic arrangement of bouquets, and all classes, from the palace to the cottage, manifest a passionate love of such humanising and healthful occupations. Nowhere in Europe, we are assured, are gardens so numerous, or the love of floriculture so extensively developed. One very curious art they seem to have brought to great perfection. Their gardens often being small, and their taste leading them to take pride in the possession of trees of the bigger species, they have gradually developed the art of dwarfing them without in any way sacrificing their general shape and proportion. Father and son and grandson will grow an Oak, for instance, for fifty years or more, and will take means of preventing it ever attaining more than 18 in. or 2 ft. in height, though still presenting all the characteristics of the full-grown tree in trunk, branch and foliage. Among their family treasures to be handed down from one generation to another may often be found a well-arranged garden, established in some antique specimen of Japanese pottery in the shape of a capacious bowl. Within this receptacle will be walks and trees and flower-beds, with a great variety of floral favourites, all dwarfed to the proper proportions. One further development of this odd manipulation of natural objects is the patient training of the minified trees and shrubs into the forms of birds and beasts, or any other object that may strike the fancy, or may be suggested by the accidental shape of the plant, a refinement of gardening which in barbarism very nearly approaches our fashion of clipping shrubs into plum puddings, or perpetually snipping trees that might become beautiful into close imitations of German toys.

Original Articles.

THE ROSE.

HYBRID PERPETUAL ROSES.—(*Continued.*)

We will now endeavour to give a list of this numerous family divided into groups of each colour, and for this purpose adopt the classification of that veteran rosarian "Rivers," as given by him in his "Rose Amateur's Guide," adding only the names of the many new varieties introduced since the publication of the last edition of that invaluable little work.

DARK CRIMSON.

There are but few varieties of this class of colour—I mean with those dark velvety petals so common among the French roses and hybrid Chinas, and with flowers full and perfect in shape. It has always been a curious fact in rose culture that dark, almost black roses have either been semi-double or ill-shapen, so that it is only within very recent times we have received varieties with flowers large, full and tolerably shaped, still we ought not to give up the culture of Emperor de Maroc: its flowers are very double, not large, and slightly reflexed. It forms a pillar rose of much beauty, its flowers are so rich and deep in their colouring. Alexandre Dupont. Prince Camille de Rohan, Reynolds Hole, Roseriste Jacobs, Souvenir de Charles Montault, Souvenir de Victor Verdier, Sultan of Zanzibar, Vicomte de Vigier, Xavier Olibo, Abel Carriere, Auguste Neumann, Clovis, Comte de Flandres, Crown Prince, Dingée Conard, Dr. Hogg, Duc de Rohan, Duke of Wellington, Empereur de Bresil, Fontenelle, Jean Cherpin, Jean Soupert, Lord Beaconsfield, Monsieur Boucenne, and Monsieur Eugene Delair are all dark roses generally shaded with purple.

CRIMSON AND SCARLET.

There are many shades of this colour in the roses of this family, depending for their brilliancy much on climate, season and situation. Among the most brilliant is the well known Geant des Batelles, now old, and almost forgotten, the most bright and brilliant of all roses, and at the same time one of the most hardy and free-growing. No rose of late years has been so popular. As an instance of this I may mention that in the autumn of 1849, eight thousand standards and dwarf of this variety were dispersed over the whole face of the country from this place (Mr. Rivers' Nursery).

This beautiful and favorite rose is now the parent of a numerous family, every member of which, when first ushered into the rose-world, has been pronounced more beautiful than its far-famed parent. After a time, however, most of these promising children have settled down into esteemed members of the Geant family, but have not totally eclipsed their parent.

In enumerating the fine roses of this range of colour one is almost bewildered, so numerous are they. It would seem when one sees a fine flower of Senateur Vaisse just on the point of expanding, that no rose, or indeed no flower, can be more brilliant, more beautiful, yet I have sometimes bent over Gloire de Santenay, and thought it still more so; the flowers of both are so perfect in shape, so brilliant, and so exceedingly beautiful. Charles Lefevre, Francois Lacharme, Alphonse Damaizin, Maurice Bernardin, Professor Koch, Madame Julie Doran, Oliver Delhomme, Alfred Colomb, Le Rhone, Lord Macaulay, Antonie Dacher, Baronne Adolphe de Rothschild, Comtesse de Oxford, Dr. Andry, Duke of Edinburgh, Fisher Holmes, Louis Van Houtte, Marie Baumann, Vainquer de Goliath and Lord Clyde from a perfect galaxy of rose beauty. I cannot see the possibility of surpassing the above by new varieties, and yet they come, or pretend to come, every season from France. Every spring some fine new varieties are ushered into the rose-world of England, and some thousands of francs have been sent over to our neighbours in exchange for a host of new names, to be added to the rose catalogues of the day so as to perplex both buyers and sellers. This incessant introduction of novelties without novelty is, I fear, bringing rose cultivation to Charlatanism, which can only be stemmed by the English growers, being well assured of the qualities of a new rose before they recommend it. We must not pass over some old friends in this class of colour. General Jacqueminot, with its luxuriant growth and magnificent clusters of flowers, has always been a favorite, and will continue to be so although its large crimson flowers are not so full and perfect in shape as those of the varieties I have enumerated. The following are the principal varieties belonging to the class besides those above mentioned :—A. G. St. Hilaire, Alfred de Rougemont, Auguste Rigotard, Camille Bernardin, Charles Darwin, Crimson Bedder, Dean of Windsor, Docteur Baillon, Dr. Hooker, Dr. Sewell, Duc de Montpensier, Duchess de Caylus, Duchess of Bedford, Duke of Teck, Edouard Pynaert, Empress of India, Eugene Appert, Exposition de Brie, Ferdinand Chaffolette, Francois Louvat, Glory of Cheshunt, Henry Bennett, Horace Vernet, Jean Liabaud, Jules Chretien, Lady Sheffield, La Rosiere, Lord Raglan,

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Madame Charles Crapelet, Madame C. Wood, Madame Ferdinand Jamain, Marechal Vaillant, Marguerite Brassac, Masterpiece, May Quennell, Monsieur Etienne Levet, Monsieur E. Y. Teas. Pierre Seletsky, Mrs. Baker Mrs. Harry Turner, Mrs. Laxton, Pierre Notting, Prince Arthur, Red Dragon, Robert Marnock, and Star of Waltham.

Carmine.

The roses of this range of colour are perhaps the most chaste and pleasing of all, as their flowers are for the most part so elegantly shaped. Prince Leon is a gem ; and is remarkable for its vigorous habit and fine foliage. To this now old variety we may add Jules Margottin, which, taking all in all—its fine colour, shape, fragrance, robust habit, and freedom of flowering—may be pronounced the finest rose known. How grand are its early flowers, the personification of our old cabbage-rose, with a perfume quite equal, and a bright rosy pink colour far more interesting.

The following kinds will be found perfect and beautiful :—A. K. Williams, Amicet Bourgeois, Baron Haussmann, Beauty of Waltham, Boildieu, Constantin Fretiakoff, Devienne Lamy, Dupuy Jamain, Ernest Prince, Francois Courtin, George Baker, John Hopper, J. S. Mill, King's Acre, La Ville de St. Denis, Le Havre, Louise Dore, Madame Clemence, Joigneaux, Madame Ducher, Madame Therese Levet, Mdlle. Marie Rady, Marie Louise Pernet, Marquis de Castellane, Paul Verdier, Richard Laxton, Sir G. Wolseley, Thomas Mills and Ulrich Brunner Fils, these form the *creme de la creme* of this group, and no roses can be more charming ; they all, or nearly all, have an intensity of rose colour, if the expression may be used, which is of all colours the most pleasing, for do we not say "the rosy morn," "the rosy hues of life," and employ many other expressions all denoting the invariable charm of this most delightful of all tints?

Rose Coloured and Pink.

Almost numberless are the roses of this tint, so that it is really difficult to select a few that are most worthy of the attention of every amateur. Our old friend La Reine is still in dry seasons most beautiful and fragrant; but her daughter Louise Peyronny is still more so, for, owing to this charming rose not being quite so double, it opens well in all seasons. The following kinds are distinct and very beautiful :—Abel Grand, Alice Dureau, Anna Alexieff, Annie Laxton, Baronne Prevost, Calliope, Catherine Bell, Centifolia rosea, Duchess of Edinburgh, Elie Morel, Hippolyte Jamain, Julia Touvais, Lady Sheffield, Madame Caillat, Madme Eugene Verdier, Madame Fillion, Madame Montet, Mdle. Eugenie Verdier, Magna Charta, Marchioness of Exeter, Marguerite de St. Amand, Monsieur Paul Neron, Nardy Freres, Oxonian, Pierre Durand, Queen of Waltham, Royal Standard, Victor Verdier, William Warden, William Griffiths; but let us not forget a rose of a charming silvery rosy lilac colour, Madame Vigneron, which the raiser declared, when describing it, "glistened as if powdered with silver."

Are there yet more gems? Yes, new names and new and fine roses; for such are most perfect in all that constitute fine roses. Another and another still, for who can pass by and not admire Comtesse de Chabrillant? No rose can be more perfect or beautiful; and yet we may add Duchess de Cambacres, a most vigorous growing rose, blooming in immense clusters, giving flowers with a powerful fragrance. Of all the roses in this group the Comtesse de Chabrillant is the most perfect in shape and colour like Senateur Vaisse or Charles Lefevre among crimson roses; it is quite impossible to imagine a rose more beautiful.

Blush and Flesh Coloured.

Among the most desirable varieties in this class of colour is Madame Rivers with flowers nearly white ; it is a vigorous grower, and appears to bloom well in all climates. With this very fine rose we may class Madame Vidot, of the same exquisite shape, but tinted with delicate pink so as to be wax-like and most beautiful. Besides these we have Bessie Johnson, Captain Christy, Charles Rouillard, Comtesse de Serrenyi, Duchess de Vallambrosa, La France, Baroness Rothschild, Madame Marie Finger, Marquise de Mortmarts, Miss Hassard, Peach Blossom, Pride of Waltham, Princess Louise Victoria, Rosy Morn, Sophie Coquerelle, and Marguerite D'Ombrain.

White.

We have as yet not a long list of roses of this desirable colour, though several very choice varieties have been introduced during the past few years, among which are, Baron de Maynard, Boule de Niege, Helene Paul, Julius Finger, Mabel Morrison, Merville de Lyon, Madame Francois Pettit, Madame Hippolyte Jamain, Madame Lacharme, Madame Noman, Mdlle, Bonnaire Reine Blanche, Merville de Lyon, Violette Bouyer and White Baroness.

FLORICULTURE IN INDIA.

The Fuchsia—Part II.—*(continued from page 300.)*

Culture in detail first year.—I will now run through the culture in detail; commencing with the propagation by cuttings, and ending with the season of rest, by describing the *modus operandi* generally, suitable for the hill stations of this country as now in practice.

Propagation.—The Fuchsia has been improved by culture, and hybridization, whereby many improved species have been obtained. I shall not attempt any description of hybridization, &c., as that has been explained already through the medium of this paper. All I need state here is, that the Fuchsia is one of the easiest of subjects for a tyro to commence upon.

Cuttings.—The cuttings that make the best and strongest plants, are the first newly-made shoots, the earliest growth of the season ; I have already recommended these, and stated the time, and season when they should be taken. The hot bed and glazed boxes are the most suitable for them ; but do not use a newly-made bed for them, a slightly spent one is much safer and better, about three weeks after it has been in use, and any excess steam there may have been has subsided. Use a very sharp knife in making the cuttings and remove the two lower leaves of each ; so that a clean cut may be ensured. Also use thoroughly clean pots, if new, so much the better.

Drainage and preparation of pots.—In preparing these use a single piece of potsherd, termed a crock by English, and *tickery* by native gardeners ; let it be thin, of a size to cover the hole and almost the entire bottom of the pot, place the hollow or concave side downwards and the circular or convex upwards ; (the upper shell of an oyster is not only an excellent pattern, but makes the best of drainage for pots, and food for the roots of plants. In the suburbs of London they are collected and used for this purpose, and in country places also, where available.) The native mallee will reverse this if not prevented. His idea is that the water when put into the pot should remain there. It is beyond his comprehension why we let it run away. On this (western) side of India he wont have any hole in the bottom of the pot at all, hence the slimy condition of the pots in which plants are grown; nevertheless he gains his point in the argument, and will manage to convince his employer in nine instances out of ten, that he is right. We beg to differ in our method of drainage by keeping the hole clear and not allowing any stagnancy. Over this put a little charcoal or brick-dust rubble, or siftings, and upon this a little dry moss or cocoanut fibre. Fill the pots three parts full with pure sandy loam, or if not sandy, brick-dust, and fine charcoal may be mixed with, the soil ; fill up with the purest sand available : silver sand is best. Do not use any vegetable soil of a decomposing nature, it is apt to engender fungoid, growth which may and does attack soft-wooded cuttings, causing them to damp off. Plant the cuttings six or eight against the side of the pots, do not crowd them; give enough water to moisten the soil and prevent the cuttings from drooping, sprinkle slightly half an hour before sunset and close

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the sashes, to maintain atmospheric humidity. Avoid excessive moisture, or damping off will set in. It must be taken into consideration that you have a moist bottom heat to deal with, not a dry one.

Temperature.—The cuttings thus treated will strike in a few days, if the temperature is maintained at 60° minimum, at night and 75° maximum by day; this may, when the cuttings are struck, be allowed a greater range, *viz.* 55° at night to 80° by day, with plenty of ventilation. Commence the ventilation at the mean or intermediate figure and increase by degrees in accordance with the state of the external atmosphere, and the working of the thermometer; should it fall, reduce until the external atmosphere is warmer.

Potting off the Cuttings.—When the cuttings are struck, (rooted,) pot them off as soon as possible, before the roots begin to run into each other, or become matted, or they may be damaged, and the young plants receive a check, which should be carefully avoided.

Size of pots to be used.—Use the smallest size pots, *viz.* thumbs, of 2″ or 2½″ or 3″ diameter and depth, by so doing you will not only economise room in your frame, and canvas shed, but your plants will, by the time they are fully grown, at the end of the season, be in pots varying from 8″ to 12″, and 14″ to 16″ in the second and following years, and may be confined to those last named sizes.

Remarks on pots.—This last size is the largest that is generally used a bye-law of the old Horticultural Society of London, now the Royal Horticultural Society of England, allowed nothing larger for the Exhibition of specimen plants. Up to this size they are manageable by one man. Above this, it requires two men with a hand barrow, therefore should be used as specialities only. In the hills it is difficult to get pots larger than 10″ to 11″ the *koomars* (potters) cannot manage the making or burning beyond these sizes; they say the fault is in the clay used.

Tubs and Boxes.—Tubs and boxes are used up to the size of the hogshead cask cut in two. However good a substitute this may be as regards breakages; it is not so as regards plunging. For my own part, I prefer a 16″ well burnt pot, and the facilities it offers and affords for plunging and moving from place to place,—in preference to the best wooden tub or box.

Treatment after potting.—After potting, the plants should be returned to the cutting box or frame, for a few days, until they commence growth.

Culture.—This should be seen to beforehand; if new beds have been made, and time allowed for them to settle, and throw off the rank steam; four inches of sifted soil will keep down a moderate amount, and serve for plunging the pots into as well; after three days, try this bottom heat with a thermometer at four to six inches deep, and if found to be steady at 80°, the young plants may be plunged; if they flag keep them close until they are all right again, then increase the ventilation gradually for a day or two, afterwards considerably, until the sash lights are taken off for several hours in the day, weather permitting; and canvas shading only being used; and this if kept well above the plants, will admit ventilation more freely, and ensure short-jointed, sturdy growth, which is of considerable importance, and will, at the same time, ensure plenty of side shoots for furnishing the plants. Should this be neglected, an elongated lanky growth will be the result; also a paucity of side shoots.

In a fortnight or three weeks, or possibly less, if the bottom heat remains steadily active, a second shift will be required. This must be attended to without delay if the pots are well filled with roots, 4-inch pots will be the predominant size on this occasion; be particular in potting to see that the stem of the plant is in the centre of the pot, and upright; it is much better at this stage of the plant, and size of pot, to bring a stem to the erect position if necessary, by placing the ball a little sideways, than to run the risk of breaking or distressing the stem, by using force to straighten it otherwise.

Commencement of Training.—If any plant should want a stake to its central branch, or stem, now is the time to do it. When this potting, &c., is finished, the coldest or first made of the hot beds, will be the best place for them, in this intermediate stage of transit from a hot to a cold frame or pit. If this cannot be spared the plants must go direct into the cold frame or pit, there to be plunged and kept close and somewhat warm by the aid of sun-heat for a few days; allow sufficient room for expansion for a month, or it may be somewhat less by the time the next shift is required. One foot for each plant will not be too much. By the time the plants are ready for the second shift, that is the third re-potting, a change ought to have taken place both in the weather, and the warm or summer season have set in, and our amateur may have the satisfaction of seeing all his boxes, frames, or pits, thrown open fully, and the shading adjusted and secured for the day, before he sits down to take his breakfast preparatory to his going to office, when at starting, he will give his mallee instructions, and caution him to be on the alert for any change that may take place &c.; these will be received most graciously by that individual with a *salaam*, and *moloom sahib*, will have entered his head at one ear and have made their exit at the other as speedily; his employer goes to office he to his domicile, first to take his food, and hookah, then sleeps until a few minutes prior to the return of his master, for whose appearance, at a certain point, a watch is alway set daily, and the *khubur* given all round; the mallee is then at his post as busy as a bee.

Time for first topping.—The plants will in all probability have made side shoots; when these are about five or six joints, or six inches long, they will require topping to cause them to break again, each branch will give three or four shoots, by which means alone the plant will become thick and well furnished. Most of the plants, if not all, will require a centre stake for support to keeping it upright the height will be a foot more or less, and the time for commencing the training will have arrived.

Culture and Training.—At this stage another shift will be required. Some of the upright growing kinds will be very shy of making side branches; it must now be determined what shape the plant is intended to be grown to; and this must finally be adhered to. (Our object here is to mention the time at which the training ought to be commenced; its description in detail will be fully dilated upon under its proper heading). The culture of specimen plants from this point is simply the same thing over and over again, and will amount to repetition to attempt the description; I will therefore mention the principal points only. The practical cultivator knows, and the amateur will soon find that the operations of potting, stopping and or training will all come at one and the same time, if he confines his actions to this routine, with one exception, *viz.*, the leader, or central branch may require at intermediate times a tie or two. These rounds are continued unceasingly until the beginning or middle of December if the weather remains fine and open (for sometimes snow falls in November and December early, after which the frost comes on too severely for our pets to be exposed) when they may be dried off and put into their winter quarters until the middle or latter end of March, when they may be brought forward and pruned amongst the last batch as detailed in Part I., to be grown larger or flowered as may be desirable.

Having completed the culture or growing of specimen plants for the 1st year, I will now describe in order. Wintering or resting; Insects; Pruning, Potting; Training; Shading; Structure; Making hot beds for this and general purposes, &c., which will form Part III.

EXPERT.

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THE VEGETABLE GARDEN.

How to Grow Potatoes.

The cultivation of the Potato has certainly not received the attention it deserves in this country ; being principally in the hands of natives, it makes little or no progress, and until the subject is taken vigorously in hand by amateur growers, we can neither hope for improved varieties nor for a better system of cultivation. The aim of the cultivator should be not only to grow as heavy crops as possible, but also to produce the tubers of good quality. The nature of the soil as well as the treatment given materially affects the crop in both respects, and a suitable selection of varieties is of great importance. No esculent is more easily grown in a great variety of soils than is the Potato, but according to my experience a deep friable loam is the most suitable ; not soil that previously has been heavily manured and perhaps lightly cropped, but good fresh loam, of which a fresh enclosed piece of meadow land is a good type. This fresh soil will yield good crops for one or two seasons without manure, but after receiving a good dressing of manure the crops, if well managed in other respects, would be enormous. Such soils in a favourable season are by good management made to produce from 12 to 15 tons of Potatoes per acre. Of course, private growers seldom have the advantages of a virgin soil, but heavy crops may be obtained from some old-established gardens. A soil very full of manure is quite unsuitable for Potato growing, and to obviate this difficulty it is very advisable to dress it over with hot lime and to bastard trench. It may be advisable to explain for the benefit of those for whom these remarks are intended, that bastard trenching is breaking up the land two spits deep without bringing the bottom spit to the surface, it being in most instances much too poor and unworkable. The top spit of the wide trench is wheeled to the finishing point, the bottom spit is broken up, and on to this the next top spit is thrown, the shovellings of the latter being good fresh soil that oftentimes has not been touched by the spade for years, any manure that may be used, it is advisable to work in between the spits and not out of reach of the roots. Where it is impossible to trench, the ground should be deeply dug, and if too rich, may be brought into good condition by a dressing of hot lime only, and then taking off it a good crop of Brussels Sprouts, Broccoli or Cabbages. To be brief, a heavy crop of Potatoes of good quality can best be obtained from a comparatively poor soil heavily manured at or about the planting time.

Of manures I prefer that obtained from the stable, to which artificial or concentrated manure, notably Guano, are very valuable adjuncts. The latter supplies much ammonia, of which the manure frequently used by gardeners is nearly destitute. The defect in most artificial manures is absence of humus, hence in dry seasons unless used in conjunction with solid manures, they are of but little value. The heaviest crop of Potatoes I have ever seen was taken from land manured at the rate of ten tons of manure and five cwt. of Guano to the acre. The condition of the seed Potatoes or sets materially affects the weight of the crop, and for this reason deserves great attention. Observant growers attach much importance to a change of seed, and the results produced are abundant evidence in support of their theory. Seed Potatoes should never be allowed to sprout in heaps, or they will be much weakened thereby; choose moderately strong sets sufficiently started to enable the operator to rub out all side shoots, the centre and strongest one only being retained. This is very important with Kidney Potatoes, the centre shoot being so much stronger than the side shoots. I do not attach much importance to the selection of handsome tubers, although some growers consider this the *sine quâ non* of success. If rounds or those kidneys of the Snowflake type are scarce, by all means cut them into two or more sets according to their size, but the best results generally follow those planted whole, provided the central shoot only is allowed to grow. Potatoes that are very valuable and scarce may be propagated from cuttings, or they may be cut into as many sets as there are eyes, dipped in either slacked lime or sand, bedded in leaf or vegetable soil, and placed under glass till they have started and emitted roots. Water sparingly at the commencement, and transfer to the trenches before the roots have spread far.

The time of planting must depend entirely upon local circumstances. The soil cannot work too well, as the lighter the soil in contact with the tubers the better the quality of the crop, consequently the time of planting must be regulated by the state of the soil as well as the kind of weather experienced. We place the rows of Ashleafs and others of moderate growth 2 feet apart, and the sets 10 inches apart. The rows of strong-growing varieties are placed 3 feet apart, and the sets 1 foot apart in the rows. The Scotch Champions and Magnum Bonums on strong soils require still greater distances, 4 feet between the rows and 15 inches between the sets not being too much. The sets are dibbled in by many, but I think it a wrong practice, especially if the soil is heavy. As before stated, the soil about the sets should be well broken up, the better to enable the "runners" or Potato-producing roots to extend freely ; but when a dibber is used, unless the soil be light and open the reverse is the case. Another expeditious method is that of digging-in the sets, for by this practice the soil about them is well broken up, and the ground is not trampled on after planting. The sets are placed in the drills formed during the process of digging, and covered over with the next spit. Lines are used, and the rows placed the usual distances apart I prefer planting in drills, whether on trenched or newly dug ground. These are drawn with a heavy hoe, and vary in depth according to the composition of the soil ; if light and open they are 6 inches deep, if at all close much more shallow. Previous to planting the ground is stirred to a good depth with a fork, giving a dressing of soot at the same time. When the sprouted sets are planted they are first covered with soil by the hand, and then covered over, forming slight ridges, between which we dig or loosen with a fork. When pushing through the ground they are again covered over, and again forked between, both operations being finally repeated when the growth is about 9 inches high.

The selection of varieties must depend upon the nature of the soil. New varieties should be tried, if only to be discarded, for it is a mistake to grow a great collection, however interesting it may be. The American varieties—such as the Early Rose, Alpha, Snowflake, and Breadfruit—are particularly good for light sand, but are comparatively worthless on heavy soils. Of the Ashleaf type Veitch's Improved and Mona's Pride, especially the latter, do well with me; and of early rounds a good variety of Dons and French Shaws are the most profitable. The latter especially ought to be more grown in private gardens. On light soils Porter's Excelsior crops very heavily and is of good quality, and the Early Coldstream is also good. Of second earlies I like Snowflake and Woodstock Kidney. Rector of Woodstock, although small, is a heavy cropping round variety of excellent quality. For the main crop I recommend Schoolmaster, Victoria, Regents, and Scotch Champions—rounds ; and of kidneys Prince Arthur, Covent Garden Perfection, and Magnum Bonum. I do not recommend anyone to plant either the latter or Scotch Champion too largely; but a breadth of one or both should be planted as a measure of precaution. It will, however, be a mistake to rely too exclusively on them, as should a dry season ensue short crops will be the result, for the simple reason that they are very gross feeders, and unless they receive very liberal treatment in the way of deep cultivation and abundance of rain and manure, will fail; at least, such is my experience with them. Disease-resisting they undoubtedly are in a marked degree.

A. B.

LONDON OFFICE

OF

THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

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Correspondence.

THE EDITOR "INDIAN GARDENER."

DEAR SIR,—Kindly let me know what percentage of Bulbs or Tubers purchased in this country I may reasonably expect to turn out "blind." I bought, the other day, (V. P. P.) from a Firm advertizing in your paper, ½ a dozen Dahlia Tubers, only one of which has come up They were all put down on the 8th ultimo, one sprouting in a few days after. The others appeared to be mere *chips*, not "Tubers" at all.

That which has sprouted is a "Little Beauty," single. Kindly let me know what colour I may expect it to be.

Yours, &c.,

L. A. S.

Prome, B. Burmah.

NOTE.—Without knowing what treatment the tubers received, it is impossible to give any opinion on the subject. Our correspondent has certainly been extremely unfortunate, as Dahlias under proper conditions rarely fail to start into growth. A very similar case was referred to us a few months since, and on making enquiries we were informed by the "apparently" aggrieved individual, that at the time of planting he had removed all the old stems from the tubers, under the belief that they would grow the stronger for it. Poor ignoramus! he was unable to distinguish the difference between the formation of the tubers of the Potato and that of the Dahlia, the latter in reality being merely an enlarged root, and beyond acting as a reserve store for the sap, takes no part in the development of the plant. Probably the tubers now complained of had been similarly amputated, or rather decapitated, at some period of their existence.

Little Beauty is described as having flowers of a beautiful light magenta-rose, yellow and buff at base of petals, small and well shaped.—ED., *I. G.*

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to, should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that all correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

SINGULAR VEGETABLE FORMS OF THE ROCKY MOUNTAINS.

Our valleys offer rich soils for horticulture; our mountains yield minerals, metals, and chemicals, as well as choice timber, flowers delightful and fragrant, Nuts, fruits; and even the arid plains and deserts produce a new world of the strange, the useful, and lovely, and altogether they are a study of the grandest magnificence beyond the power of pen to paint. A person passing over our deserts is impressed with the utter desolation around, the vast distance, the burning sand, absence of moisture, the thorny, leafless Cacti, Agaves, Yuccas, and starveling, stinted shrubs. It would seem to the unpractical mind that were a person lost upon these desert plains, a rescue from death would be hopeless; and yet these ugly Cacti are composed of three-fourths water, the sere shrubs bear a delicious berry, the Spiny Yucca bears an edible fruit resembling a Banana. The Cacti produce a fruit often delicious, and the Agave bulb, when properly roasted, gives a sugary, nutritious food. The Cereus gigantea often rears its head 20 ft. or 30 ft. straight or with projecting arms like a mighty giant guarding the treasures of the lone desert or the passes in the mountains. The Yucca brevifolia or Needle Palm is another magnificent specimen, rising from 10 ft. to 20 ft., often with umbrageous head, and the numerous limbs giving terminal masses of cream-coloured bloom, sometimes weighing fifteen to twenty pounds; the seed formed in a dry capsule, fruit, size of a Peach. This fruit in Northern Mexico and Arizona is called sotol, and is used quite extensively as an article of food. The tree-like body of the plant, which is often 20 in. to 24 in. in diameter, is composed of a thin, gauzy network of tough filament, valuable as a paper material. Another interesting plant is Yucca angustifolia, the true Spanish Bayonet of frontiersmen, which takes the place, in general form and appearance at least, west of the Mississippi River, of the common eastern species, Yucca filamentosa, which is found from the Mississippi River east, usually in poor ground. One form, we are told by Dr. Engelman, has a large geographical range, reaching from Southern Utah to Central America, and it also assumes quite a variety of forms, but he says, "they are always easily recognised by their never constricted obtuse capsules (fruit), and the large broad-margined seed nearly ¼ in. broad. The true Yucca angustifolia is a low-growing or stemless species with leaves from 12 in. to 15 in. long and from 1½ in to 2½ in. wide, all growing from a common centre, and pointing in every conceivable direction, so as to form a pyramid that bids defiance to man or beast. Two other varieties of Yucca angustifolia, which Dr Engleman has named elata, from Arizona, grows several ft. high, and radiosa also grows several ft. high. The leaves are linear, stiff, and end with a sharp-pointed spine. The flowers are a greenish-white, and produced on stems about 4 ft. or 5 ft. high, while the fleshy edible fruit is often 3 in. long and ½ in. across. The leaves are thick, stout, about 3½ in. long and ½ in. broad, and not narrowed above the base as in most other species, but gradually narrowing down to a sharp spike-like point. It is margined its entire length with sharp serrated edges, and are thickly set in a crowded bunch at the ends of the branches. They are also fibrous and from the edges are a few thread-like filaments hanging, the whole of which is also a valuable paper material. Other species of Yucca also belong to this region, but they are of less importance than those just referred to.—*Case's Botanical Index.*

THE RESOURCES OF NORTH BORNEO:

TIMBER.

That the future prosperity of Sabah must depend upon the introduction of outside capital, and the attention of outside capitalists, interested of course to their own ultimate profit, in its development, is a fact that admits of no adverse argument. Every individual, every country, and every community depends more or less on the principle of "give and take" to mutual advantage of each. Sabah possesses in itself resources which are practically illimitable, but to develop them, as they are capable of development, requires the attraction to the country of men, able and willing to put in their lot with, and further their own fortunes, while at the same time they are advancing the interest of the colony. It must be admitted that, up to the present, outside enterprise in the country has been, to say the least, very limited. With the sole exception of the Chinese Sabah Land Farming Company no operations on any large scale have been attempted. True, the Australian Borneo Company started on a large scale; if taking up 100,000 acres of land may be classed as "operating"; but they have for over twelve months made no further sign, although it is probable their lethargy will be changed to activity within the next three months. The Deutsche Borneo Company are at work on Baugney Island, but, with these three exceptions, outside enterprize in the way of planting can only be named on the *lucus a non lucendo* principle. With regard to the Australian Borneo Company, it must always be borne in mind that their primary object was taking up a large acreage for the purpose of sugar planting, and that, almost synchronous with the arrival of their agent in Borneo, sugar fell considerably in the market, so much so as to drive the sugar planters of Fiji and Queensland to the verge of despair; this being the case, it is not perhaps to be wondered at that sugar "stank in the nostrils of the Melbourne capitalists.

Mr. de Liesa, the pioneer sugar planter in Sabah, could do nothing in Melbourne in the way of raising capital to facilitate the growth of sweet cane on the banks of the Sagalind; but he discovered, what previously had apparently been quite unknown to him, that his land had a value in itself that did not require any planting to bring out. He discovered, or rather

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he was told, that the Seryah on his estate was a wood resembling very much the Queensland cedar which owing to the reckless denudation of the scrubs, and the absence of any conservancy regulations in that colony, is rapidly becoming extinct. Samples of the wood submitted were approved of; a Syndicate was formed, and subject to the approval of an expert, Mr. de Lissa was offered a good price for his timber. The result is already known.

The expert, Mr. Stewart, is enthusiastic in his praises of Borneo timber, and his enthusiasm has proved very catching in the great capital of Victoria. And now we come to the main point, or "bed rock" to use a digger's phrase of this article, which is, that the timber trade will prove the first big enterprize which will bring about *bona-fide* results between British North Borneo and Australia to the benefit of both Colonies. It is already known that the samples of the same timber shipped by the steamer "Woosung" are appreciated in Victoria, and if properly worked, the Seraysh of this country should take the place of the Queensland cedar, a wood which is nearly unprocurable at the present time. There is no hard wood in Australian colonies, not even "Jarrah," which will compare in durability to billian, while billian possesses two qualities which the "Jarrah" does not possess. It is ant-proof, and proof against the attacks of the water worm. Therefore as a wood for sleepers and Australian railways, to be used in the construction of Australian wharves or from which to manufacture piles to be driven into the beds of Australian waters, billian is unequalled. There is a gentleman at present in Sandakan who has made it his business to make every enquiry into the capabilities of hard-wood timbers, and who is empowered on behalf of powerful Victorian syndicates to secure a concession to cut timber on land in the colony. This gentleman has sent samples to Melbourne of billian, camphor, krueng and compass, and has also had cut and forwarded sleepers made of billian, as specimens of what this wood is. He is confident that the timber once seen and tested in the colonies, the result will be the inauguration of a traffic between the two countries will develop into immense proportions. He is also engaged in the developing a trade in all sorts of produce, and has sent samples of every item to Melbourne, but he maintains that the starting of the timber trade is but the thin end of the wedge towards establishing a trade, the proportions of which will eventually grow to an extent which it is at present almost impossible to estimate.—*Tropical Agriculturist.*

THE PANSY.

Amongst flowers which come under the care of the florist, perhaps the Pansy may take the highest rank. Although rigid florists of the Glenny school have repeatedly attempted to bind it down with arbitrary laws, declaring that no Pansy can be tolerated whose form is not a perfect circle, and whose colours have not their margins as carefully defined as if they were drawn with compasses; still hosts of lovers of the beautiful among all classes, from the hardy sons of toil to the most exclusive of our aristocracy, have continued to grow and admire the Pansy in all its irregular forms of simple beauty and delicious sweetness. Pansies do not at first appear to have received so much attention in the South as in the Northern parts of the kingdom, the few varieties then in cultivation being less able to withstand drought and heat than the more robust and hardy types now grown. In 1760 Justice observed many varieties growing about Edinburgh, and as they seeded freely, he actually recommended people to keep them in check, as otherwise they would overrun the garden. Again in 1786 Abercromby gives a list of named varieties. He states that he considered the Pansy to be an annual, although in mild winters it might prove to be biennial or even perennial. The Pansy, like many other flowers, had to submit to changes of fashion, but it never entirely disappeared from our borders. About 1840, however, it became one of the leading competition flowers, and, as the inevitable result, its lines became more stiff and rigid, as may be seen from illustrations of it in gardening periodicals of that time. Ten years later, florists divided the show Pansy into different classes, such as white and yellow grounds and dark and white and yellow selfs, and in May of that year the National Pansy Society held its eleventh annual exhibition in The Thatched House, Hammersmith. The only seedling raiser and competitor at that show now remaining is Mr. Charles Turner of Slough. The most important society that was formed after the National is the Scottish Pansy Society, which has now existed for forty-one years; and after being long in comparative obscurity, during which its membership was by no means numerous, it has for some years been growing in public favour; its membership has greatly increased, and its annual exhibition in June attracts competitors from the most distant parts of the three kingdoms. This old society, by keeping the merits of the Pansy before the public, has induced a number of its own members to form auxiliary societies in different parts of the country, and thus still helps to spread and encourage a taste for this most useful flower.

The varieties of the Pansy are so numerous that there is ample room for all growers to follow their own particular fancy. Thus the florist *par excellence* has done good work in enlisting the keen sympathies of a large body of kindred spirits, who while adhering to a certain standard of perfection, have widened its bases and admitted many changes which would have been looked upon as the grossest heresies by those who founded this school. On the other hand varieties discarded by the florist, because of their vagaries in form and colour, have now become the most popular of the old race. The show Pansy only was known in this country until about thirty years ago, when a few varieties of a different character were introduced from Belgium. These differed from show kinds in having large dark coloured blotches on the petals, flamed or edged with colours quite new to Pansy growers in this country. The few imported flowers of this class at once opened up a new field, attracting the attention of amateurs and startling old-fashioned florists who saw no beauties in such oddities. In spite of all opposition, however, the work then begun has gone on steadily and rapidly. Professional growers saw that it was to their interest to cater for the public demand, and by taking the brightly coloured flowers and crossing those having more substance in the petals, they soon began to combine the thick texture of the one with the glowing colours of the other; and now the improvement has been so rapid and marked, that one is afraid to say that perfection has even yet been attained.—*The Garden.*

DIVERSITY OF FORM AND COLOUR IN PLANTS.

When we consider the wealth of plants both flowering and fine-foliaged which are adapted for general culture in our gardens, we may not unreasonably expect to find a great amount of variety therein. It would appear, however, that that adherence to fashion which Alphonse Karr has so admirably satirised still so far affects the gardening world as to produce a certain amount of sameness and uniformity in our pleasure grounds. Many plants undeniably useful and highly decorative are but sparingly met with, and their merits receive but partial recognition. So long as the rage for bright, glaring colours and strong effects exists, so long will this state of affairs continue. Whilst plants are only valued for the effect which they produce in crowded masses, we shall not see much alteration in our present system, and many of our best plants will remain in unmerited oblivion. I should be sorry to see our Pelargoniums, Verbenas, and Calceolarias banished from our gardens, but I should like to see them oftener than they are in contrast with other plants. Let us take, for instance, the Pentstemon. How seldom do we see a well-cared for collection, and yet here is a plant distinct enough in growth and inflorescence to render its presence desirable in any garden. Then there is the Antirrhinum, possessing distinctive features of its own; Lobelia fulgens, too, a noble plant, but seldom seen in good condition. Annuals, again, are too sparingly employed in a general way. What can surpass Phlox Drummondi and its varieties for delicacy and brilliancy of colour? The Zinnia, too, the Aster, and the Stock are not to be surpassed for effect; and yet for one bed or patch of such subjects as these one may count twenty of the so-called bedding plants. These, too, are but a few of the great numbers which deserve mention, but my object is not so much to give a list of desirable subjects as to show how very easily uniformity and sameness may be made to yield to that diversity of form and colour, which is the delight of the true plant lover. It is to be regretted that there is not a more general attempt, at least in small gardens, to stamp each one with a character and individuality wholly its own. We sometimes see a garden where the owner, disregarding the prejudices of fashion, has accumulated the plants which he loves best, and placed them in such situations as are most congenial to them. Such a garden to whoever cherishes plants for their individual worth, and who finds a charm in each and every kind, is a

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never ending source of pleasure. Many conceive that when they have succeeded in introducing all the colours of the rainbow into their parterres they have done pretty well all that is needful to secure a good effect. This is, however, far from being the case, as I hold that diversity of form rather than variety of colour is the main feature to be kept in view, either in planting permanently or merely for the summer season. It has probably fallen to the lot of some to have casually come across a garden which, although not more favoured in extent and situation than many others, possessed an indescribable charm; yet when this same garden was, as it were, analysed, it may have been found that the charm really consisted in the use of subjects which contrasted and yet harmonised with each other. As an instance, I will take the Pampas Grass. Where does it produce the best effect? Not isolated upon an open expanse of Grass, but where it is in proximity with rigid, close-growing trees and shrubs. Or take again, a large Fuchsia standing in the midst of a carpet of variegated Periwinkle; here we get diversity of form combined with variety of colour. In what does the interest belonging to the Fernery, the Alpine rockwork, the rustic rootwork, reside? Simply in its not only affording a complete contrast to everything else but in producing in itself innumerable variations. It is noticeable, too, that these effects may be easily obtained by employing plants of easy culture and of a comparatively hardy character; we have no need to ransack our stoves for this purpose. The hardy Ferns are as beautiful as exotic ones, and variation in foliage and general growth may be found amongst those plants which require but little protection and need but little care. Variety is to be obtained not only by means of the introduction of plants, trees, or shrubs possessing distinctive characteristics, but also by happy and tasteful combinations. An isolated tree, around the trunk and amongst the branches of which rambles some hardy climbing plant, and at the foot of which a tuft of some graceful Grass, a Fuchsia, or hardy Fern springs up irregularly from amidst a carpet of Ivy, will impart an air of freedom and natural grace to a place, and will tone down the formality which more or less exists in all well-kept gardens. In the case of tree and shrub planting, more might be done than is generally attempted with the view of giving variety. We have evergreens of many tints, and varying immensely in habit of growth; monotony in this direction is, therefore, inexcusable. It is really not more difficult to obtain variety in small gardens than in those of greater extent, the only difference being that suitable subjects must be chosen. There must also be a resolute determination to avoid repetition; never retain a quantity of any one plant because it is exceptionally attractive, as in the end it will, by excluding others, become uninteresting. My advice would be to select judiciously plants of each kind sparingly, and above all make a study of the various habits and tints of vegetable forms, in order to produce tasteful effects and harmonious combinations. If instead of emulating the blaze of large establishments and public gardens, amateurs would allow more scope to their individual tastes and inclinations, choosing the plants they like instead of adhering strictly to those which happen to be most in vogue, they would find more true enjoyment in their gardens than they now do, and we should have the pleasure of occasionally seeing plants at their highest stage of development which are but rarely seen or are consigned to some out-of-the-way spot where they get but little chance of developing, their true character.—*The Garden.*

YARD MANURE AND WOOD ASHES.

I have been asked to state the comparative value of unleached wood ashes and barnyard manure for Apple, Peach, Pear, and Cherry trees, also in regard to composting the two. Barnyard manure varies to so great an extent that it is impossible to place a standard price upon it. What it may be worth depends upon the kind and condition of the animal, the nature of its food, the relative amount of litter mixed with it, and the amount of soluble materials removed by rain, &c. For this discussion I will take fresh horse dung as a standard, the horse having a mixed feed of one part Oats and three parts meadow hay, the dung being free from all stable litter. This dung contains 75 per cent of water, 2½ per cent of ash, and 6-10 of one per cent of nitrogen. A ton of such manure contains 12 lb. of nitrogen, worth 2 dollars 40 cents, and 50 lb. of ash, containing in addition to the lime, magnesia, sulphates, chlorides, &c., 11·6 lb. of potash, worth 77 cents, and 4·9 lb. of phosphoric acid, worth 61 cents, or a total value of 3 dollars 78 cents a ton, estimating these three materials at commercial rates. This calculation is made on the assumption that the phosphoric acid is all soluble in water, and that the nitrogen is as valuable for fruit trees as it is for field crops, both propositions somewhat doubtful. Wood ashes represent all the mineral elements of vegetable growth, and contain everything the farmer must give his crops except combined nitrogen. Wood ashes will vary in composition and value with the kind of wood and the part of the tree. I will take the ash of the body wood of the Beech tree as representing the average of wood ashes. A ton of such ashes contains 320 lb. of potash, worth 16 dollars, and 105 lb. of phosphoric acid (insoluble), worth 5 dollars 25 cents. Omitting all the other ash constituents, which have some value of themselves, the potash and phosphoric acid of a ton of such ashes are worth 21 dollars 25 cents, or nearly six times the value of a ton of fresh horse dung. For orchards I regard ashes as worth more than six times the value of barnyard manure, ton for ton. When barnyard manure is composted with wood ashes the coarse vegetable material and litter are rapidly broken down, and the manure is speedily fitted for use; but there is some loss of nitrogen in the form of ammonia, but there will be no loss of mineral matter if kept from leaching by water.—Dr. R. C. Kedzie, Michigan Agricultural College, in the *New York Tribune.*

VARIORUM.

A well-known American comedian is said to have a habit of biting his finger-nails. He also has a small daughter. The other day "that dear child" deliberately pared her finger nails, and, in the innocence of her heart approaching her comical progenitor, "Papa," said she, "here are some nails for you to eat."

His Half.—Horace Greeley used to tell this story. He once sent a claim for collection to a Western lawyer, and, regarding it as rather a desperate demand, told the attorney if he collected it he might reserve half the amount for his fee. In due time Mr. Greeley received the following laconic epistle —"Dear Sir, I have succeeded in collecting my half of that claim. The balance is hopeless."

A Member of Congress from the Far West who was invited to a dinner at Washington, is now telling his constituents all about it. "There wasn't anything on the table when I got there," he says, "but some forks and spoons and bricky-brac. Presently they brought in some soup. As I didn't see nothin' else, I thought I'd eat all the soup I could, though soup is a mighty poor dinner to invite a feller to. So I was helped four times; and then came on the finest dinner I ever see, and there I set," groans he, "chock-full of soup!"

For Anti-Sportsmen.—Sir Francis Head, speaking of the pleasure of the chase, gives an anecdote of a hard arguer in favor of fox-hunting in these words—"Said the haughty Countess of——to an aged huntsman, who, cap in hand, had humbly invited her ladyship to do him the honour to come and see his hounds, 'I dislike everything belonging to hunting—it is so cruel.' 'Cruel!' replied the old man, with apparent astonishment. 'Why, my lady, it can't possibly be cruel, for'—logically holding up three fingers in succession, —'we all knows that the gentlemen like it, and we all knows that the hosses like it, and we all knows that the hounds like it.' After a long pause—'None on us, my lady, can know for certain that the foxes don't like it."

A Farmer entered a Detroit restaurant with his hat on the back of his head and a joyful look in his eyes. Flinging his hat on the floor, he exclaimed, "Whoop! Sold my wool, and now I want a tip-top dinner!" He was invited to sit down at a table, handed a bill of fare, and asked to name his dishes. "I want chicken, turkey, oysters, fish, quail, snipe, pie, cake, soup, wine —bring on the best you've got in the shanty!" he observed, as he pushed the bill away. The waiter hurried out, and the farmer produced his wallet and counted his money. His face grew serious after a few moments, as he began to realise that luxuries cost money, and in another minute he pounded upon the table, and called out, "I want to see that waiter!" The waitre

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entered, and the farmer continued—"You hold on a little. You may scratch out that other order, and bring me in some meat and 'taters and bread. I've sold my wool, as I said before; but I just happened to think that the corn crop may bust on me—and where'd quail on toast be then? So bring along the meat and 'taters."

A GENTLEMAN'S GENTLEMAN.—The following anecdote is told of the eccentric Lord Redesdale. Early one morning he made his way to the mansion of the Earl of Lucan. He was dressed in sporting garb, for he was going to attend a race-meeting, his hat was on awry, and a cigar was between his lips. He rang at the front door, and the earl's best man—an exquisite of the first water—answered the summons. "Is the Earl at home?" "No, sir! The Hearl is not at 'ome." He mistook the caller for a sporting servant, very likely seeking employment. "Do you know if he has gone to Windsor, my man?" "No—I don't know hif 'e 'as gone to Windsor. But I'll tell you what I do know. You'd be a doin' of yerself a wast deal o' credit hif you'd honly just run around to the sign o' the Bell an' Crown, hand fetch me a pot of 'alf-an'-'alf. "All right, where's your money?" "Wy, bless you, I don't find money for them as I has to hanswer the bell for! 'Aven't you got a sixpenny bit of yer own?" "I guess I can find one." And away his lordship went, really enjoying the business, and shortly returned with a tankard of foaming half-and-half. The valet drank it with a keen relish, emptying the pot, and then offered to return it, with —"There, my good fellow —I'm much—" But the visitor put the pot back, and cut the speech short with "Return the tankard yourself, my man; and, when your master returns, be kind enough to tell him that Lord Redesdale called." His lordship left the dazed and confounded valet supporting himself against the door-post, the pewter-pot fallen to the floor, his face the picture of horror and despair, looking for all the world like one who wished he had never been born!

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THE INDIAN GARDENER

A Bi-Monthly Journal of Horticulture in all its Branches.

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XV.

TRANSPLANTING LARGE TREES.

In this country, where vegetation as a rule is of extremely rapid growth as compared with that of a more temperate climate, it is very rarely necessary to attempt the difficult, and at all times uncertain, experiment of removing very old or large trees. In Europe, with improved appliances and the advantage of a long resting period, although instances have occurred in which trees perhaps 400 to 500 years old, and with the soil attached weighing from 40 to 50 tons, have been moved for a considerable distance with safety, still the work is always attended with a considerable amount of risk. In this country, for various reasons, the chances of failure are materially increased ; first, we have, comparatively speaking, no resting period, and the majority of trees employed by us are evergreen in habit, and are growing more or less through the entire year. Second, that in a climate like ours, subject to a season of eight or nine months' drought, most trees are necessarily deep-rooting subjects, frequently striking down to a depth of ten or even twelve feet in search of those elements so essential to their existence, whereas, on the contrary, in a temperate climate the majority of species are surface-rooting, and few attain a depth of more than five or six feet. It is scarcely necessary to remark that the additional weight of soil required to be lifted with a deep-rooting subject adds materially to the labour and risk of the operation.

Although we do not recommend the adopting of this system of planting for this country, still instances frequently occur, especially in the formation of new gardens, where it is absolutely necessary to secure immediate effect, and this can only be secured by employing subjects of considerable size. The following practical remarks on this subject, which recently appeared in the *Gardener's Chronicle*, describe the treatment essential to success :—

"The proper planting and after-treatment of large trees in their new quarters is as important to their ultimate well-doing as their careful preparation and removal. The soil and site should, if possible, be equal or superior to that from which they came. Planters are often very much fettered in the choice of a site, and that which taste selects may frequently possess the worst soil. Fortunately the latter is generally capable of improvement, and if not, it may be removed bodily to make way for better. It is a good practice to dig out the holes for the roots a year or so before the trees are planted. These may vary from 3 to 12 or more feet in diameter, and from 18 inches to 4 feet deep according to the size of the trees to be planted. The soil should be thrown right out about two spits deep round the hole, leaving about 1 foot or more of good soil in its bottom. During the summer the earth in and out of the holes should

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be kept free from weeds, and frequently forked up, and fully exposed to the sun and air. Such treatment will sweeten and mellow it, and thus prepare it for becoming far better food for the roots But should the soil not be good, this part of it should either be carted away or spread out thinly over the surface, and better soil brought to supply its place. It is almost a waste of labour to plant in clay, sand, gravel or other sterile or bare soils. Where such are found on the sites where artistic considerations demand the placing of the trees, it is best to boldly take the bull by the horns and cart it away at once, bringing some good mellow loam back in its place. But it is comparatively seldom that the soil formed is wholly or irredeemably bad. Mixed with a third or a half of other and better soil, or given a dressing of well-rotted manure or leaves, with a few months' aëration and cultivation, it will mostly be brought into a condition fit for growing most kinds of trees.

"In all cases such root holes should be made 18 inches or more wider than the ball of the transplanted tree is likely to be. This is of the utmost importance. Not a few of those who are careful to prepare and cultivate root runs for the coming trees make the holes too small. When the balls are inserted the fit is so close as to admit little or no fresh earth between it and the hard unmoved earth that forms a ring of rockbound hardness around it. Now it really matters far less what sort of soil is under than on either side of it, and yet not a few are prodigal of good stuff under the roots and give little or no growing soil to the right or the left of them. There can hardly be a greater mistake in the earth arrangements of newly transplanted trees. These, unless very young indeed, seldom make many more roots in a vertical direction ; the roots have, in fact, under proper culture, such as that already described, run to the outside of the bole. There they will be found in crowds, each with its fibrils ready to strike root at once into new soil. But supposing the ball is dropped into a root hole just large enough to receive it, the roots are checked in their growth against sterile soil within a few months of the time of planting, and the top growth is stunted in consequence ; but by leaving a foot or a yard all round, the young roots shoot into the best possible soil at once, and a satisfactory start is made. A good start is more than half the victory in the case of transplanted trees of great age or size. By making the holes early and well preparing their sides, their area is virtually enlarged 6 inches or 1 foot all round by the mellowing influence of time and the atmosphere. Under the combined effects of these the sides of the holes crumble down, and harsh sterile soils are sweetened and enriched.

"In the actual planting of large trees three points demand special attention—the position of the top, the height of the bole or stem, and the disposition of the roots. It is a common practice with many planters to turn trees round in transplanting them. For example, the north side of the tree is placed south, the south north, and so on. No practice could be more unphilosophical or dangerous. The excuse made for the turning round of trees in transplanting is that all sides may be made alike, hence the attempt to make the thinnest side as vigorous and strong as the best by exposing it to the sun, the great strengthener and consolidator of vegetable life. The attempt, however, fails. The fact is, the sun is admitted to the wrong side of leaves and stems by the turning of the trees round, and well nigh scorches both instead of strengthening either. Large trees should always be faced in the same direction as that in which they stood before moving, if a speedy and healthy growth is expected.

"The bole should never on any pretence be inserted deeper or raised higher than it was before planting. Thousands of trees have failed to grow to any good purpose, or have died outright, through want of attention to trifling matter ; for probably the most sensitive and tender part of the whole tree is that border-land between root-stock and stem—the natural earth or base-line of the bole. So important is it neither to bury deeper nor unduly expose the root-crown of trees, that in all cases where moss or other rubbish may have overlain this line before transplanting, some damp moss or other litter should be again used after transplantation to cover the base of the stem to the same height. A slight excess of such covering does little harm, whereas a single inch of stem exposed that had been previously covered perhaps for years may cause the death of the tree. Many transplanters of large trees seem to imagine that the stems need no sort of care and less attention. They are looked upon as mere pipes to convey fluids from the roots to the tops, or *vice versâ* ; hence they may be turned round, exposed instead of shaded, &c., with entire impunity. There can hardly be a more serious mistake. The whole of the outer portions of the stem is full of life, and as such is almost sensitively alive to every change of position and condition ; hence, in all cases where large deciduous trees have been removed from more sheltered into open spaces, or their tops have been considerably lightened or thinned, the whole of the bole, and even the chief branches, should be wound round with haybands to keep off the direct rays of the sun from the bark. In dry weather the bands should be soaked with the garden engine at least twice a day, to prevent any loss of the vital fluids of the tree by evaporation through the bark. These precautions are the more necessary with isolated trees in exposed localities. No doubt they involve trouble, but such careful attention has saved scores of newly transplanted trees that would have perished without them ; and if it is worth while going to the greater expense of transplanting large trees, it is surely worth while to adopt every possible precaution in order to save their lives and re-establish their healthy growth as soon as possible. The roots, as a rule, have been far better cared for than either the tops or the boles. The earth under them should be made firm, and the depth of the ball carefully measured before it is placed, as a tree that has to be taken out again after it is once placed may be said to be half ruined in the planting. The roots should be carefully examined, all wounded or bruised ones being cut off with a sharp knife. The sides should be filled in and made moderately firm as the work proceeds, a few wooden rammers being most useful for this purpose. Where roots protrude round the ball, each should be placed in its own place, neither above nor below it. This is important, as each root or series of roots will thus have a run of earth all to itself, instead of being crowded up with others. When finished form a basin all round the roots by heaping up the spare soil 6 inches high on the solid ground outside the diameter of the holes. Then flood the whole of the roots home with a barrel or two of water, till the earth runs smooth and no fault-hole or hollow place remains. As soon as the water subsides, sprinkle the surface with an inch or so of dry earth, and cover this 4

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inches thick with litter, moss, or rough leaf-mould, or cocoa-fibre refuse. This will render the whole well-nigh drought-proof.

One thing more is necessary—to steady the tops and roots of the tree. It is obvious that if allowed to be swayed by the wind, many fresh formed roots would be snapped off, and the tree might even be blown over. There are three general methods of preventing this—staking the top, staking the ball, and steadying the tree by leverage. The first is only fit for small trees, and is so simple and common as to need no explanation; the second is useful for trees of moderate size: three stakes are driven in at equal distances, in the solid earth, beyond the holes dug for the roots of the trees, strong beltings are then placed from one to the other, right across different sections of the ball; these are nailed firmly down to the posts and the ball, and consequently the roots immovably fixed to the spot. Fixing trees by leverage is best for those of large size. The levers may be connected by strong cords, wires, chains, or bars of iron; they are best placed as a triangle, proceeding from a considerable height—say 10 feet up the stem or bole, and a sure holdfast 10 or 15 feet distant from the tree. The higher the ties are up the bole, and the further the ground end from the tree, the stronger are these sorts of hold fasts; if firmly fixed in the ground to posts or hooks, and of sufficient length and strength, such supports will hold anything.

In any sort of tying every care should be taken not to abrade the bark, the simplest preservative being a closely wound hay-band under the iron clasp or other contrivance used to ensure the strength and stability of the bole end of leverage or other ties. The advantage of fixing the bole of trees over their roots is obvious. Fix the roots firmly as we may the swaying top must agitate, loosen and snap them more or less. Rigidly hold fast the top in one position, and the roots become from henceforth immovable of necessity. In any case perfect fixity of tenure to the roots until they have grown sufficiently to establish themselves in the new soil sufficiently to resist disturbance from wind and storm, is essential to success in the transplantation of large trees.

Editorial Notes.

The little State of Delaware has this year produced no fewer than 1,000,000 baskets of peaches, worth about four shillings a basket.

Castor-oil mixed with an equal weight of tallow or other oil is, according to the *Chemist and Druggist*, an excellent dressing for leather. Besides this, neither rats, cockroaches, nor other vermin will attack leather so prepared.

Flower Bulbs.—Much judgment should be shown in purchasing. Bulbs should not be selected for their size, but for their weight and solidity; a small bulb that is heavy and firm, especially about the point of growth, will produce a much finer flower than one double the size, but soft and scaly; and hence it is not right to estimate them by their size, so much as by their weight and proper maturation.

Slow Tree Growth.—At a recent meeting of the St. Louis Academy of Science, Dr. Engelmann exhibited a section of the trunk of Juniperus californica, which was not quite 4in. in diameter, and yet showed an unmistakable age of 127 years, each ring being on an average about one-fifth of a line wide. The largest growth in ten years had been about 4 lines, the smallest during a similar period about 1½ line.

A New Use For Wood.—The application of wood for stuffing beds seems, at first sight, an anomaly, nevertheless, a patent exists which moreover appears to be quite practicable, for disintegrating the wood of various kinds of Pine, so that it becomes as light and elastic as hair. The resinous properties of the wood cause it to be very healthy, and to act as a preventive against vermin. It is producible at a price far below that possible for any other material, except straw and seaweed, in quantities as low as 4s. per cwt.

Rhubarb.—It was not until the beginning of the present century that stalks of rhubarb became an article of commercial importance in the London and other vegetable markets in the kingdom. About 1810, Mr. Myatt of Deptford, we are told, sent two of his sons to the Borough market with five bunches of rhubarb stalks, of which they sold only three, people not liking what they called "physic pies." Notwithstanding, Myatt continued its cultivation. As he predicted, it soon became a favourite; and now hundreds of tons' weight of rhubarb are sold in Covent Garden in the course of the year, and what amount in other markets all over the country it is impossible to calculate.

Soil for Potted Plants.—Some little knowledge of the character of soils is required by those who mix and prepare them for potting; but we may say that, in general, finely sifting any soil, except perhaps for covering seeds or other special purposes, is seldom done. Such soils need not necessarily become impervious to water if there be sufficient sand in their composition. One thing, however, we must caution the inexperienced against, and that is, never to move a pot or pan that has been newly filled, and then deluge it with water. A mass of fine earth, thoroughly wetted, and then shaken in a pot, becomes much like concrete. Pot in moderately-dry mould, and remove the plant to its final resting-place before watering. Generally speaking, coarse lumpy mould for large plants, and fine for small ones, with, however, plenty of drainage in both cases, is advisable.

The Root-Cap.—The idea held by the earlier botanists, that the tips of all roots consisted of spongy masses of tissue, by means of which plants were enabled to soak up their food from the soil, has, with the aid of the microscope, been entirely discarded. The term spongiole, which was given to these theoretical bodies, is a landmark of departed ignorance, and furnishes striking contrast with the known structure (viz., the root-cap), with which the tip of every growing root is covered. With the leading botanists of to-day a root is considered to be an outgrowth protected by a cap. This definition seems very short, but if anything further is added, there comes with it a number of exceptions. The name which this covering to the root-tip has received is in itself very descriptive, as it is truly a cap, consisting of a number of layers of quite dense cells surrounding the extremity. These root-caps vary in size in different species of plants; sometimes they are so small that only with the high powers of the microscope can they be seen, while on the other hand they may be readily observed with the naked eye.—*Gardener's Monthly.*

The Camphor Tree.—*Nature* calls attention to one of the most interesting and important trees of Sumatra, the camphor tree, *Dryobalanops camphora*. This camphor attracted the attention of the earliest voyagers, and was then, as it is now, an important article of commerce with China and Japan, the pepole of those

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countries attributing to it extraordinary virtues, and paying a high price for it. The tree grows to a height of 100 feet or 130 feet, and forms a trunk seven feet to 10 feet in diameter. The quantity of camphor contained in the trunks is very unequal; the young trees appear to contain little or none. It is said that, on an average, about nine trees are required to produce 100 lb. weight of crystallised camphor. It is obtained by cutting down the tree and dividing the wood into small pieces, in the divisions of which the camphor is found. It differs in the form of its crystals from the camphor of commerce, is harder, more brittle, and does not so readily condense. Great quantities are used by the Bataks for the preservation of the corpses of their chiefs.

Movements of Leaves.—Leaves, Mr. Darwin says, when they go to sleep, move either upwards or downwards; or in the case of the leaflets of compound leaves, forwards, that is, towards the apix of the leaf, or backwards, that is, towards its base; or again they may rotate on their own axis without moving either upwards or downwards; but in almost every case the plane of the blade is so placed as to stand nearly or quite vertically at night. Moreover, the upper surface of each leaf, and more especially of each leaflet, is often brought into close contact with that of the opposite one, as the upper surfaces appear to require more protection than the lower. The evil effects which result if sleeping leaflets be prevented from pressing their upper surfaces together, so as to protect them from radiation, were well seen in experiments of Mr. Darwin's, in which he pressed down the leaflets of Oxalis, Marsilia, &c., so that they could not bring their upper surfaces into contact; the result was that the leaves were killed. Thus of twenty-four leaves of Marsilia extended horizontally, exposed to the zenith and to unobstructed radiation, twenty were killed and one injured, whilst a relatively very small proportion of the leaves which had been allowed to go to sleep with their leaflets vertically dependent, were killed or injured. Mr. Darwin noticed that the difference in the amount of dew on the pinned-open leaflets and on those which had gone to sleep, was generally conspicuous, the latter being sometimes absolutely dry, whilst the leaflets which had been horizontal were coated with large beads of dew. Another fact observable was that when leaves were kept motionless, they are more liable to injury than when they were slightly waved about by the wind, and thus got a little warmed by the surrounding air.—*Popular Science Review.*

The Influence of Light upon the Colours of Flowers.—The influence of light upon the colours of flowers has been further investigated by M. Askenasy, who has described his results in the "Botanische Zeitung." It was found that Tulipa Gesneriana gave in darkness the same flowers as in light, and the flowers of the plants grown in darkness were in no wise altered when they were afterwards brought to the light, and the etiolated stems and leaves became green. On the other hand, Hyacinthus orientalis showed the influence of light in two ways; first, the light accelerated the development of the flowers, about fourteen days; then the flowers which grew in the dark were not indeed colourless, but the intensity of the colour was less, and its distribution was different from that in normal flowers. If the upper part of a cluster of flowers grown in darkness were cut off and exposed to light, there was, even after one day's action, a decided increase in the intensity of the colour, and in three days the flowers were nearly as deeply coloured as the normal flowers. Scilla campanulata developed in the dark normal flowers, in which the blue colour of the corolla was somewhat weaker than the uncovered specimens, while the reddish colour of the inflorescence of the normal plants was absent in the darkened ones. Pulmonaria officinalis, on the other hand, developed its flowers in darkness from the flower buds quite normally, and also in the darkness the change of colour proper to this flower passed from red to blue, but the flowers that were developed later were more weakly coloured. The experiments here described show that many flowers need light to acquire their normal coloration, while others can dispense with it. Wherein lies the ground of this difference does not yet appear, and numerous further experiments will be necessary before the phenomena can be reduced to order.

The Trees of Judæa.—Judea, once renowned for the number and variety of trees which grew within its borders, is now poorer than any other country in this particular. Mr. W. J. Martin, in his work on the East, says:—The only trees one meets are the Olives, which, however, are by no means plentiful in Judæa, and mostly old and stunted-looking. In Samaria we saw several considerable plantations of them, but yet that country is also sadly deficient of trees. Where now is the Oak tree on which Absalom hung by his bushy locks? There is, I believe, only one remaining sufficiently large for this; and yet we read that the "Wood of Ephraim," where he was defeated, destroyed more men than did the sword. And where is the Sycamore tree upon which Zaccheus climbed? I doubt if there be one such within many miles; and yet we know that Jericho was once richly clothed with trees and verdure, and called the "City of Palms." Indeed, that Palestine generally was once extremely fertile, and rich in woods and verdure, is evident from the meaning of many of the Scripture proper names. . . . . There is along almost every little water-course a number of what are called trees, but they are generally Willows of mere copse or brushwood. A tree of any description, of size sufficient to make an ordinary beam for building purposes, is quite a rarity—such are only to be found miles apart. The Vine, so much alluded to in the Bible, is somewhat rarely to be seen; but that it was extensively grown is evident by the traces of terraces upon the steepest hills still abundantly visible. Then as to the flowers—"The Rose of Sharon" and the "Lily of the Valley" cannot be found. There are many wild flowers certainly, but generally they grow out of a "dry ground," and have, with very good blossom almost no green foliage. "Thorns and Briars" are abundant, but with very little foliage also, and seem useful only for burning. The Fig trees are even few and far between, and the Orange, Apricot, and Almond still more so. The fields are not enclosed, except in some rare cases, where a wise husbandman has gathered the loose stones into piles around his border. Hedges are rare, but when seen they are generally formed of large Cacti covered with dust, having in the twilight a somewhat weird look.

Original Articles.

THE ROSE.

Forms of Growth—(*Continued from page 277, Vol. I.*)

Pillar Roses.

These when properly trained are undoubtedly very attractive objects. But, probably on account of the great care and attention required to produce anything like a satisfactory result this mode of training is but very rarely attempted in this country. The following description of the *modus operandi* by one of the most eminent of English Rosarians will probably prove both interesting and instructive to those who may desire to attempt their culture.

"The culture of Pillar Roses certainly demands some skill; but it is a skill that is easily acquired by the observant and enquiring cultivator. Let us consider the several points in regular order, so as to dismiss all simple matters with a word and deal with difficulties as they come before us at such length as their relative importance may demand.

Planting Pillar Roses.—In any case the soil must be well drained, liberally manured, deeply stirred and in a sound condition. It should be of such quality as to produce good wheat or cauliflowers, or it will never produce Pillar Roses. A Pillar Rose will require at least one square yard of soil, which must not be occupied with shrubs or grass, and every autumn this soil must be enriched with dressing of half-rotton stable manure. Whatever tends to increase the vigour of a Rose—such as top dressings in summer, abundant supplies of water, &c.—must be given to Pillar Roses; for it is not only desirable to clothe the Pillars, but to do so with *stout wood* which can only be accomplished by feeding liberally. Let us suppose the Roses planted, they are

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then to be cut down to within one or two buds of the base and allowed to grow the first season as they please, and the more vigorously the better.

PRUNING PILLAR ROSES.—The second season they will require pruning. Now to prune them properly the Rosarian must bear in mind that it is much easier to induce a tree to grow to its full height than to induce it to form regular tiers of flowering wood all the way from its root to its summit. This is true of Apples, Plums, Pears, Vines, and hundreds of other trees. Keep the leading shoot, upright and do not prune it at all, and it will grow with great vigour so as continually to increase its length until it reaches its maximum height; but in the meantime the leading bud having monopolised the sap, there will be but few side branches formed, and consequently there will be little or no flowering wood produced. It is true that trees do produce side branches without the aid of the pruner, and that these take a horizontal or oblique direction; nevertheless the general tendency of the sap is upwards, and one of the first consequences of allowing a tree to grow in its own way is to cause the formation of a bare stem for some distance from the ground line; and that tendency is of itself a sufficient argument for pruning Pillar Roses. In a word, if the pruning is neglected they soon acquire their full height but have naked stems; whereas, if properly pruned, these stems will be clothed from head to foot with flowering branches. The pruning in the second year will consist in removing by a clean cut, to within one or two buds of their base, all long weak shoots, reserving two or three of the strongest shoots and shortening these about one-third or one-half of their length. If any doubt as to the application of these instructions let the Rose itself furnish a hint. If it has attained to a great height, and is so regularly furnished with side shoots as to be already nearly sufficient to cover a pillar, prune all the side shoots back to three or four buds and the leaders only a fourth or fifth of their whole length. If it has not grown much cut it back very hard, removing quite half of the entire growth so as to conform pretty nearly to this rule—the more growth, the less pruning; the less growth, the more pruning. Having accomplished the pruning, lay the shoots down full length along the ground and fix them with a few strong pegs so that the wind may not blow them about. This will cause the buds to break—that is to say will cause the formation of side shoots the whole length of the rods: as soon as these burst freely they must be tied up to their poles or pillars.

The third season's pruning must be on the same principle as in the preceding year; the cultivator must be more anxious about obtaining plenty of furniture—that is, of hiding the pillar with a plentiful side growth from the ground upwards. He need not think much about getting the Rose to the top of the pillar; it will go there in time and perhaps sooner than will be good for its ultimate beauty; and if it does not, it is only necessary to leave one or two long rods unshortened and they will soon mount to the summit of their ambition. To begin, then, with the pruning, let us first determine about the furniture of the base of the pillar. Here we find already plenty of weak spray, some well placed strong shoots, and perhaps a certain proportion of wiry twigs that produced flowers last season. All the weak spray should be cut clean out, leaving only the buds at the base to break again; the same with the wood that flowered the previous year, but the strong side shoots may be cut to six or eight buds from the base. Where the pillar is bare, cut a few shoots very close so as to get some vigorous growth to fill up the gaps; where crowded thin away the weakest of the shoots, and leave those that are best placed for flowering. Proceed thus till you arrive at the top, then shorten back the leading shoots according to their length and strength, but not severely, to a plump bud to carry the growth upward the next season.

After this pruning there ought to be an abundant bloom; and from this time forth there must be very little pruning; the cultivator's principal care will be to keep the tree liberally nourished and provide for the occasional *renewal of the main shoots*, for those originally formed will in time be debilitated through excessive production of flowers.

The renewing or repairing of the pillar is accomplished by means of the strong shoots that rise from the base. As these appear tie them in loosely, so as to induce a free growth, prune them as recommended for the first formation of the pillar, and as soon as they reach half way up the pillar and are tolerably well furnished with side shoots remove one of the old leaders, and let the young one take its place. When an abundance of young shoots are produced some must be cut away entirely to within one bud of their base; from the bud left a flowering shoot will generally be developed next season, or it may be another strong shoot, which may be useful though not wanted the previous year, in which case keep it, if not pinch it back and cause it to form a mass of laterals, or leave it to grow to its full length and then cut it back as before. Two more remarks seem needful to complete these directions. By training the leading shoots straight up the pillars they will grow with more vigour; by training them regularly round and round the pole the growth will be more moderate and regular, and there will be an earlier disposition to form flowering wood. It is well in all cases to allow new shoots to go straight up and to twist them the next season after the pruning. This secures strong wood in the first year and plenty of laterals in the second. The last remark is, that poles and pillars should not exceed twelve feet, and when it is determined to have them of that height the most robust growing Roses should be selected. The better kinds of hybrid-perpetuals and Bourbons do best on pillars of six to eight feet; if taken higher it is difficult to keep them furnished at the bottom.

We may now offer a few remarks as to the poles and pillars themselves. It is best not to insert them till after the Roses have grown two years, and when inserted, it must be in a way to stand firm in a gale. In all cases it is best if the lower parts of the posts can be charred, as this prevents the growth of mycelium, by which so many Roses are destroyed by the proximity of decaying wood to the roots. The superiority of iron must not be overlooked, for not only is wood perishable, but the soundest wooden pole may be snapped short off by a gale. If iron poles are adopted they should be one inch in diameter with triple prongs proportionately stout, and the prongs should be from one to two feet in length, proportionate to the height of the poles above ground.

CLIMBING ROSES.

Climbing Roses certainly receive less attention from writers and cultivators than almost any other class of these popular flowers; but why this should be the case we do not pretend to know, unless it is perhaps that they require more attention to ensure their being in first rate condition. However that may be, it is very certain that there are many good Roses which require support in some shape or form to bring out their good qualities. For poles, pillars, arches, arbours, &c., only those Roses are suitable which have more or less of what is called a climbing habit of growth—we say what is called a climbing habit of growth, because, strictly speaking, there is no such thing as a climbing Rose. Roses do not climb or cling to anything in the same way that such strictly climbing plants as the Vine, the Honeysuckle and the Ivy do. Roses which make long rambling growths, whose shoots are unable to stand up without support of some kind, these are the kinds which do duty as climbers. Before determining on the kind of climber to plant, however, the height the plants are required to attain to must be considered. Fortunately in this country we have a very wide field from which to make our selection. What are known, however, amongst English Rose growers as climbing Roses, such as the Ayrshire, Banksian, and Boursault groups, are entirely unsuitable for cultivation in the plains although they thrive vigorously enough in the Himalayas at an elevation of 4,000° to 8,000.° Their absence, however, is more than counterbalanced by the large number of other species which are here well adapted for this purpose. Most of the vigorous Hybrid Perpetuals and Teas may be relied on from 8ft. to 15ft. if the soil be good. The extra strong growers of the same classes with the Noisettes and Hybrid Noisettes will cover well up to 15ft. or even 20ft. or more in height. We purpose now to mention a few of the best of scandent habit; we had better, however, say at once that it is not our intention to enumerate all that are good, because to do so would take up too much space and also perplex our readers.

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For positions not exceeding 8 to 10 feet in height many of the hybrid perpetuals are eminently suitable, not that they can be said to be climbing Rosês, but there are many of them sufficiently vigorous in growth to reach the height mentioned within two years from the time of planting. Especially is this the case when they are on their own roots and planted in a good soil. Barrone Prevost is an excellent climber; Marechal Vaillant, Charles Wood, Dr Audry, Annie Alexieff and La Ville de Saint Denis are also good; nor must we omit to mention climbing Countess of Oxford, climbing Jules Margottin, climbing Charles Lefebvre, and climbing Victor Verdier. These possess all the good qualities of the varieties in their original form, combined with a wonderfully vigorous habit of growth. As a general rule all varieties of this group that are described as of very vigorous growth may be employed as dwarf climbers.

These who require varieties of a more scandent habit than the preceding must search amongst the Teas, Hybrid Teas and Noisettes, and may select from the following with perfect safety:—Marechal Niel, Solfaterre, Safrana, Cloth of Gold, climbing Devoniensis, Lamarque, Reve d'Or, Gloire de Dijon, Celine, Forestier, Chesthunt Hybrid and Duchess of Edinburgh. The last two are red Roses of great merit: Chesthunt Hybrid we consider one of the most useful Roses yet introduced, and certainly deserves more attention than it has yet received from Rosarians in this country, we have heard complaints of its being a shy bloomer. We think, however, in these cases, this must have arisen from over-pruning, for with us it has proved extremely free flowering, and has more than sustained the high character given it by Rosarians in England. The first nine varieties named bear yellow flowers of different shades, most of which are too well known to need any description here. In this small group we have certainly the two finest Roses in the world, namely, Gloire de Dijon and Marechal Niel, regarding the former variety the Reverend S. Reynolds Hole says:—"Its flowers are the earliest and latest; it has symmetry, size, endurance, colour and perfume. It is what cricketers call an "all-rounder," good in every point for wall, arcade, pillar, standard, dwarf, *en masse*, or as a single tree. It is easy to cultivate; it forces admirably, and you may have it almost in its summer beauty when Christmas snows are on the ground. With half a dozen pots of it carefully trented, and have a dozen trees in your garden, you may enjoy it all the year round; and if ever, for some heinous crime, I were miserably sentenced, for the rest of my life, to possess but a single Rose tree I should desire to be supplied on leaving the dock with a strong plant of Gloire de Dijon." And the same writer is scarcely less enthusiastic regarding the Marechal; he says:—"Since the time when a baby in floriculture I first began to 'take notice' of Roses, more than thirty years ago, three new stars of special brightness have glittered in our firmament—Gloire de Dijon, Charles Lefebvre and Marechal Niel. The latter is I think the greatest acquisition, because we had, previous to its introduction, no hardy yellow Rose, realising as this does—in the wonderful beauty of its flowers, their size, shape, colour, fragrance, longevity, abundance, in the amplitude of its glossy leaves and the general habit of the plant—our every desire and hope. We possessed some approximation to Gloire de Dijon in our Tea and Bourbon Roses. Charles Lefebvre was a development of General Jacqueminot, but of a hardy Golden Rose, more precious and more welcome a thousand times than those Golden Roses which Popes have sent to favoured Kings we saw no harbinger. Even the Marechal's own mother, Isabella Gray, had displayed such feeble charms that no one mourned her sterility. Suddenly, unexpectedly she produced a paragon.

It may be observed that climbing Roses, as a rule, suffer more from indifferent preparation of the soil than from neglect of any other part of their management, and I shall direct special attention to this point. To grow them in a successful manner they require the same care as is devoted to the other classes of Roses. Indeed in some cases it is necessary to take more than ordinary care in the preparation of the soil, as they have frequently to be planted in hot dry positions, and when such is the case it is necessary to make the border somewhat deeper than would serve for a bed of Roses on the lawn. These positions also require the soil to be of the very best description to ensure a free and continuous growth, for unless a Rose tree, no matter what the form it may be grown in, does not continue to make growth it cannot flower in a satisfactory manner. In all cases where there is a doubt about the soil, or the spot being of a suitable character, it should be taken away to a depth of two feet and a width of two feet six inches, and be replaced with good soil. A rich fibrous loam, if it is to be had, with one-third part rotten manure, is decidedly the best, but any good mellow loam with the addition of manure will do.

Vigorous-growing varieties of Roses, especially such as Marechal Niel, Gloire de Dijon, or Lamarque, that do not flower freely if pruned to any great extent after the principal flowering is over, require attention; whilst the plants are young, and before they have filled the space which their heads are destined to occupy, they need not be much reduced, but when they have filled anything near all the room available, if cutting back is not carried out some time in the year they get crowded with useless, weak wood, little able to produce handsome, full-sized flowers. To avoid this a portion of the large, strong, old branches may be cut out near the point on the main stem from which they spring, leaving a stump, the latent eyes of which may be expected to immediately break into growth. These will form strong, vigorous branches, which will produce the best flowers next season. This removal of a portion of the old wood annually, to be replaced by new, may be carried to the extent of one-third or one-fourth the entire plant, which, so treated, will always contain a sufficient quantity of young, vigorous flowering growth, and will not attain a dimension beyond that which there is space for, and that profusion of weak, useless shoots that results from insufficient pruning will not exist. The plants at the same time should be thoroughly well washed, so as to free them from insects. If there is any mildew upon them, a liberal application of water impregnated with sulphur will be found useful. Where planted in a position where the root space is confined, manure water, given so as to soak the whole mass of soil as far as the roots can extend, will be of the greatest possible use. This may with advantage be repeated from time to time.

INSECTICIDES.

At a late session of the Agricultural Society of France, a Committee reported upon the use of Sulpho-carbonate of Potassium as a destroyer of the insect Phylloxera, which, feeding upon the tender filamental rootlets of the grape, has almost destroyed the wine-growing interests of France.

The report of the Committee was:

"That the efficiency of Sulpho-carbonate of Potassium, employed with the precautions indicated by experience, is incontestable."

To apply the material to the roots of the vines, a light, two-wheeled horse-power machine is constructed, carrying a tank of two or three gallons capacity; from this tank the very volatile fluid is discharged by means of a pump into a hollow and perforated coulter, which, slowly drawn forward, cuts to a depth of ten inches into the soil alongside the vine roots, and, as it passes, charges the earth with fumes deadly to animal life.

Why may not an application of this idea be developed to meet a variety of cases of insect and animal depredations common in the garden.

For instance, a machine could be made, after the manner of a hand corn-planter, which could be used to charge hills of corn attacked by wire worms, or in the Market-Garden to destroy grubs cutting the roots of Melons or Squashes. It could be used to the larvæ of insects infesting the soil beneath fruit trees.

Weevil and other insects in grain can be killed by confining the fumes of Sulpho-carbonate of Potassium for an hour in a tight

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chamber with the grain. Care, however, must be taken that the apartment be absolutely tight, and that no fire be near, as the fumes when mixed with atmospheric air are explosive. Bisulphide of Carbon or Carbon disulphide can also be used for this purpose.

The gardener still wants something safe to apply to Cabbage, Cauliflower, Tomatoes, and other plants, having edible fruit, on which the application of Paris Green, a most complete insecticide, would be criminal. There is no end to the list of so-called remedies against insect depredations upon garden and field vegetables, but few are efficient. Some success has attended the application of powdered Sulphate of Iron to drive off the borer from the roots of Squashes, Pumpkins, and Melons.

Sawdust soaked in kerosene will for a time drive off the striped bugs which prey upon the leaves of these plants. Paraffine diluted four hundred times has been applied with some success to Cabbage to drive off the green worm. For the same purpose application of saltpetre with two pounds of common salt in three gallons of water has been found to be of service. A half pound each of hard soap and kerosene oil in three gallons of water has been partially satisfactory.

Infusions of tobacco leaves, pine, fir and cedar trees are offensive to insect life. Decoctions of poisonous plants, as digitalis, aconite, and others, will kill the insects, but human beings as well.

FLORICULTURE IN INDIA.

The Fuchsia.—Part III.

Wintering or Resting.—The principal points in wintering the plants are, withholding water entirely, to secure perfect rest, in which we follow nature. We also consign the plants to a room where the light is very subdued and the temperature is not affected by the sun's rays therefore becomes equalized or nearly so, day and night. At home, cellars are found to be the best places for this purpose, where the thermometer seldom deviates more than 10° winter and summer, the mean being 50°, which proves that extreme cold is not an absolute necessity for resting plants. In some instances these cellars are totally dark and not ventilated, but we prefer a gleam of light, and a small amount of ventilation under command; here again we follow nature in the matter of subdued light, for do we not at home get sixteen hours of total darkness out of the twenty-four, and the other eight reduced to semi-darkness by clouds and snow? Over a considerable area of the temperate zone, everything is buried or enveloped in snow for three months more or less. We therefore find in studying this, that practically, rest for plants can be obtainted, and effected, in these tropical and sub-tropical climates, by drought, subdued light, and a minimum even temperature combined. We study this at home in the inverse ratio, for our tropical plants and fruits, cultivated under glass; and arrive at precisely the same thing, viz. drought takes the place of cold in giving the plants rest, for if such plants are exposed to too much cold they are injured, and the least frost will kill them outright.

Protection for the roots.—The roots must also be protected by covering the pots with dry moss, leaves, sand or light soil, such as leaf mould or common earth, if lighter substances are not available. In many places cocoanut fibre and chaff, such as the husks of rice, are available which answer the purpose admirably. Do not prune or break any of the branches, as the pith is as susceptible to injury by frost as the roots are. Give no water whilst at rest—select a room or shed where the drip does not enter, if at your command to do so. If obliged to use a shed or out-house, block up the windows or any openings with grass, fern, moss or mats. Those plants that flower the earliest in spring or summer will be the first to go to rest, and must be marked, or set aside for bringing forward amongst the first batch; the second and third batches will follow in due course. Observe routine and avoid confusion; the last or latest batch should be allowed to remain until they break into growth of their own accord, when they can be no longer delayed. The one year old specimen plants that have not flowered will be amongst the last.

Pruning.—The first operation of the year is the general annual pruning. First cut away all the small puny branches and clean out the interior of the specimen plants; growth will not be wanted there but space for ventilation. On the surface cut away all the later made shoots up to three or four eyes (buds or joints,) from whence they emanated after the last general topping. If the wood is well ripened, and likely to make strong new growth, this will then form the exterior surface of the plant. If it is not so, then prune back to the next place of stopping which may answer the purpose better; never mind the scrubby appearance it may give the plants, or the waste it may appear to be by cutting away so much wood; you have an object in view, viz., the production of a fine display of bloom in the highest perfection attainable. You can soon make up for the loss of growth, by a round or two of topping as before. To maintain your plant in the proper shape and form, you may also sacrifice a little extra growth or wood here and there if needed. I have seen exhibition specimens that have won the five guinea cup, at a west of England show, on more occasions than one, for the best single specimen plant in bloom, that when pruned, at this stage, could be compared, to nothing more *apropos* than the skeleton frame of a Lady's crinoline.

Insects—Larvæ.—If you have seen any red spider, a frequent pest; white or brown scale; mealy bug, or thrip, now is the time to do battle with the larvæ deposited in the bark. The usual dressing, applied annually by gardeners at home for their Vines, fruit trees, and many other plants, especially deciduous ones, is applicable in this instance. It consists of soft soap, sulphur, fresh lime, and pure soot as this last is seldom procurable in this country, we would substitute wood ash, tobacco and cigar ash—if inveterate smokers would only save it—tobacco dust or snuff, common soda, or failing this, boil some tobacco to obtain the essence or get the chilum water from the natives and others who smoke the hooka—this last is strongly impregnated with nicotine. A strong solution for use with a soft paint brush, should be of the consistency of paint, used warm, from blood heat to 130° Fahrenheit's scale, this must be well worked into all the crevices of the bark in a lather, after all loose, rough bark has been removed by the hand or a scrubbing brush, (Fuchsias do not shed their rind until several years old). If the trees and shrubs have been badly infested previously, two coats of this is given. If the composition is up to the proper strength, well compounded, and worked into the trunk and branches, no larvæ can survive it, or make their escape. If the attack has been slight and late in the season, one coat will do. If used as a preventive only, it may be reduced in strength by the addition of water in which a good lump of common soda has been dissolved; thus diluted it may be applied with the syringe, tilting the plant over a tub to save the liquid. In this way each plant may be syringed in a few minutes and prevention may prove better than cure.

Aphides and Caterpillars.—Should the plants be attacked at any time during the season by Aphides (green and black fly) or the common green caterpillars, or any other grubs and insects, to which they are liable, this mixture, diluted and clarified by the addition of fresh lime, when required, will dislodge and eradicate them, by its use with the syringe.

Earth worms and grubs.—A strong solution of lime and soot water will also keep the soil free of worms and grubs by watering the plants with it once a week or so. This is also used as a stimulant or liquid manure to advantage, nor is any prudent, careful gardener, who understand his work ever without these materials at command, for use whenever they may be required.

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I strongly recommend amateurs, and all who would cultivate flowers, fruits or vegetables, never to be without a supply; so that they may meet an attack by a counter attack, without delay.

Mildew.—If a fungoidal attack of mildew should appear and get a start of forty-eight hours upon any collection of plants, vegetables or crop of fruit, more damage would be done in that short time than could be remedied during the season, this virulent disease may be eradicated in a few hours if taken in hand as soon as it appears, by the aid of sulphur. I may have to revert to this subject hereafter and relate some instances that would be out of place here.

Potting requisites.—Having left our pet to get it white-washed, we must now return to regular routine and the potting shed In the first place I may as well mention the few requisites needed for potting purposes.

Potting shed and its use.—A potting shed for soil, pots, tools, &c., and for use as a work-room, is a very necessary adjunct, to every garden where pot culture is being carried on. A European will require a table or bench, as it is termed, to work upon, and upon it the soil is placed.

Potting Bench, portable or fixed.—If made portable in two or three parts, it is convenient to move about from place to place such as into the canvas shed or veraudah, where the plants are, or a shady nook close by, when it does not rain. For this purpose a pair of tressel legs, and a tray formed top is convenient; or a set of four legs, folding or fixed, on which the top may be placed; or a table with drawers for small tools, labels, paint, tieing materials, &c., is very convinient. *Size for one person 4½′ × 2′-8″ to 3′; two persons 6′ long.*—In any case the top must be of stout timber to bear the weight and thumping of plants to firm the soil in the pots; with the back and ends having the frame or guard fixed to it (which gives it the appearance of a tray) to prevent the soil, &c., falling off. Useful size 4½′ × 2-8′ or 3′, for one person.

Potting Sticks, Spuds, and other Tools.—Potting sticks are required of two of sizes. These may be made out of any round stick flattened by the knife to the length and thickness required, or of split bamboo. A potting spud or two of sizes; these are generally made of a peice of teak or oak board, about 12″ × 6″ × ½″ more or less; one end is formed into a handle of about 4″ × 1½″, the front part planed down to a chisel or wedge shape, it then represents a small spade with a very short handle. This is a very useful appendage for mixing, filling pots, saving the hands and nails. A flat trowel may do, but care is required in its use, or the pots may be chipped and broken by the steel blade. A wheel-barrow and shovel, or, for the malee, a *phowra* and *tokree*. A trowel, plunging fork and small spade, are also useful appendages. These and other things, such as hand-barrow, sieves, &c., are to the gardener what a work bench and set of tools are to the artisan or mechanic.

Potting Specimen plants.—Potting has already been so fully described, that little only remains, and that refers to specimen plants and second year treatment. If the previous pottings or shifting of have been confined to the small space of half or three quarters of an inch between the ball and sides of the pots, as recommended at each shifting, and the roots allowed to fill the pots thoroughly on each occasion, the shaking away of any of the soil, as recommended in Part I. for plants in another stage will be found unnecessary, if not impossible, without sacrificing the roots, which would cause damage and a severe check at this time to the coming growth of the plants; the shifting must therefore be continued as before until the full size has been attained, and the plants have been allowed to flower, when the culture (or as it is more generally termed growth) into specimen plants is accomplished. After this the plants will require only once potting annually, as described previously; when the exhausted soil may be discarded by shaking out, &c. I may also here remark, that as the plants get aged, the puny unripened growth, made after flowering, and the corresponding fibrous rootlets, made at the same late period also, will both decay when the plants are at rest. This does not apparently affect the plants although. The increase in quantity and decrease in size or quality of flowers from year to year is perceptible after a few years, hence the reason why plants may be shaken out and returned to the same size pot again annually.

Training.—The time at which training should be commenced has been mentioned in the routine of cultivation; also how and when the toppings should take place from time to time. I have been somewhat precise, perhaps prolix, in this; its necessity will, however, be better understood when I have explained why I have done so. It has frequently fallen to my lot to have been called upon by my constituents, to take their collection of plants in hand, either after their own skill has been tried, or that of others, from whom the stock has been purchased; and invariably in the worst condition plants possibly could be. I have had to explain the difficulties, of recovering and converting such plants into anything like a reasonably fair condition and form, at one operation, or even in one season, and when my advice has not been accepted, of abandoning the task. In others, I have undertaken the work on condition of doing my best with the old stock for that season; and by striking cuttings, &c., to work up a new stock for the following and future seasons to take their places. I have also found that where a fair general knowledge of plants, their names, kinds or sorts (in other words species) and qualities, are well understood, the details of culture and minutiæ of operations have been singularly or wholly deficient. I have therefore from experience come to the conclusion, that an essay of this kind would be deficient without a full explanation of the details alluded to.

EXPERT.

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Extracts.

ASPARAGUS FROM SEED WITHOUT TRANSPLANTING.

As is well known, the usual way of getting up Asparagus is by sowing seed and afterwards transplanting the crowns. In all works on kitchen gardening this plan, and no other, so far as we are aware, is recommended. That the plan succeeds well enough, when managed skilfully and carried out under favourable conditions, there can be no doubt; but it is also true that transplanting throws the plants back considerably, and that it is often the cause of great losses amongst the plants, thereby causing much loss of time in filling the beds. Asparagus is one of the most troublesome subjects to transplant that the cultivator has to deal with. Seeds grow freely enough, and there is never any difficulty in raising young plants; but moving from the seed bed to the permanent bed is a very different matter, particularly when the plants have to be transported any distance—as, for example, when they come from the nursery, where they are not always so carefully lifted as they should be. Several plans have been suggested to prevent losses in transplanting, and one of the best is to move the plants just when they begin to grow, and not before, as is frequently done. Whichever plan is adopted, however, there are sure to be losses, causing blanks in the beds, which have to be filled up the following season.

By sowing the seed where the plants are to remain, however, and simply thinning them out to the proper distances apart, all trouble and losses are avoided. Perhaps a little more seed is used at first, and a little more space occupied for the first year or two; but these considerations are nothing compared with the advantages obtained. There are other objections that might possibly be offered to the plan, but they are not worth considering. It is well known that, by transplanting, the plants that grow lose a year or more, owing to the check they receive. The first year their growth is usually as weak or weaker than it was the year previous in the seed bed, where, had they remained, it would have been increasing in strength, and the plants would have yielded a crop proportionally earlier. To sow seed to transplant when the seedlings are two years old or more, and afterwards wait for four or five years longer for a crop, is a long while, when perhaps a third of the time might be saved by sowing seed only, as has been recommended. A few years ago the writer was asked by a gentleman to go and see a plantation of Asparagus which he had made some distance from his own place, because the situation and soil were favourable—a market gardener contracting to look after the plantation, under the supervision of a friend of the gentleman's. About an acre of good ground was inclosed, great quantities of manure applied to it, including many tons of bones, and the whole was trenched over 3 ft. deep. At the proper season young plants were procured from the nursery and the beds planted. It happened to be rather a dry time, and the plants were nothing the better for their journey from the nursery, and, though as carefully and as quickly got into the ground as possible, about one-third of the crop perished during the summer. The second year the blanks were made up again from the nursery, and again a large proportion died, but not so many. It was in the autumn of the same year that we visited the beds; the gentleman was anxious to have them in good yielding condition as soon as possible, and also to have plants for forcing. We suggested that the spaces in the rows should be ready where possible, and sown with seed, and that the remainder of the ground should be laid out in beds and also sown. This was done, and the following autumn there were no blanks on the ground, and by the third year the seedling plants were about as good as those which were several years older, and that had come from the nursery. The old market gardener received our suggestions about seedling beds rather contemptuously at first, but he acknowledged in the end that the plan answered well. This, however, was not the only example of seedling plantations we had seen, for we had learned the plan in an extensive Scotch garden, where it was found to answer, and was carried out on a considerable scale. In a large quarter there, not one blank was to be found, and at the end of the third year, thanks to timely thinning and subsequent good culture, the plants were as fine and strong as we have seen transplanted ones at the end of five years or more from the time of sowing. Beds for seedling plantations may be made in the usual way, either raised or sunk according to circumstances, and afterwards dressed and cultivated in the ordinary manner.—*"Field"*

PLANTS ROUND SAN FRANCISCO BAY.

We have now rounded the point, and reached the valley beyond. There is the usual sandbar, backed by a small lagoon, from which a rillet flows across the beach. Here we leave the shore and ascend the hill, gathering the wild flowers as we go. Patches of Lupinus micranthus and Orthocarpus erianthus fleck the hillside with blue and white, but the show of flowers is not on this southern side, exposed to the rough westerly blasts of the Pacific as they sweep through the valley, but on the moister and comparatively sheltered north eastern slope. One of the most abundant of flowers here and in the whole vicinity of San Francisco, is the Œnothera primuloides, a stemless plant with yellow blossoms, each on its own peduncle, reminding us of the Primrose. Another flower, plentiful on this hill, but very local in its distribution, is the purple and white Collinsia bicolor, belonging to the same order with the Mimuli, two kinds of which (Mimulus luteus and M glutinosus) may be found near by, the former by the water-courses and in the wet places which abound after the heavy rains, the latter on the dry hillsides. The great yellow, Daisy-like Layia platyglossa, with its ray florets tipped with cream colour, from which it has earned the name of Tidy-tips, is to be seen here and there, but does not show as it does across the bay, at Oakland, where whole fields are golden with its blossoms. The Eschscholtzia californica is here, of course; there is not a month in the year when it cannot be found, but now it is in its glory, its gorgeous orange petals inducing every urchin that comes along to gather the "Lilies," as he calls them. Another of the Poppy tribe, the little Cream-cup (Platystemon californicum), may be found if looked for, for it is modest—unlike Poppies in general. Orthocarpus is a very conspicuous genus in California generally, on this hill-side we gather, beside the white one already mentioned, the purple and yellow O. castillejoides and the tiny-flowered O. pusillus. Nemophila insignis is almost out of blossom, yet we find a few, and among the loose stones higher up the hill we find one of its rarer relations, the rough, almost prickly, Phacelia tanacetifolia of Torrey. The more common Phacelias, P. circinata, with its coarse foliage and cat's-tail-like curled flower-spikes, and the more delicate P. tenacetifolia, we do not meet with in this ramble. The Rose Order is represented only by one plant, the humble Acæna trifida, a near relation of the Sanguisorba or Burnet. Almost the only shrubs to be found are a dwarf Oak and the Poison Oak (Rhus diversiloba), the latter unfortunately only too common, as we find to our cost next day, when our wrists inflame and become covered with the pustules produced by its juice. It lurks in every bunch of tall herbage, its glossy green leaves and greenish racemes of flowers mingled with the Vetches, Phacelias, and other harmless plants in so intricate a way that it is almost impossible to collect them without contact with it. On the hill-sides it is low and straggling, its roots running to great distances under the surface, and throwing up stems and leaves in unexpected places; in the copses it forms large bushes, alone or mingled with other shrubs; but in the forests it is a huge climber, mounting the tall Pines and Firs and strangling them. When a climber, its leaves are much larger and lighter in colour, and it is usually believed to be a different plant from its humbler brethren of the meadows, being distinguished as Poison Ivy.— *American Naturalist.*

HISTORY OF THE JERUSALEM ARTICHOKE.

This plants is a production of the warmer parts of the Western Hemisphere, and consequently unknown to the ancient Greeks and Romans. Sir James Smith says, in his "Introduction to Botany," that the name of this vegetable is a corruption of the Italian name Girasole Articiocco (Sunflower Artichoke), and was first brought from Peru to Italy, and thence propagated throughout Europe. This tuber, which is more agreeable than profitable,

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was, according to "Science Gossip," first cultivated in England during the reign of James I., as we are informed that in the year 1617 Mr. John Goodyer received two small tubers, not bigger than a hen's egg, from Mr. Franqueville, of London; one he planted, and the other he gave to a friend. His own brought him a peck of tubers, wherewith he stored Hampshire; but he remarks that they are meat more fit for pigs than men. This note bore the date of October 17, 1621. From this it appears that this vegetable was introduced into England by the French, who met with it in Canada, as Parkinson, writing in 1629, mentions it under the head of Battatus de Canada, the French Battatus, or Jerusalem Artichoke. Coles also, whose work was printed only forty years after it was known in this country, called it the Potato of Canada; but we are informed in Martyn's edition of Miller, that "it was so called because the French brought it first out of Canada into these parts; not that Canada is its original country, for it is unquestionably the produce of a hot climate, being a native of Brazil."

In Parkinson's time Artichokes used to be baked in pies with marrow, Dates, Ginger, Raisins, larks, &c., but the facility with which they increased by cultivation made them so plentiful and cheap in London that even the common people despised them, although when first introduced they were said to be a dainty fit for a queen. In the "Bath Society Papers," Vol. iv., Mr. Nehemiah Bartley, near Bristol, in 1787, gives an account of some experiments he made in cultivating this plant as an agricultural crop, and states they are about equal in value to Potatoes for feeding young pigs. But their chief recommendations are the certainty of a crop, as they will flourish in almost any soil—in the corners of fields and other waste places. Under favourable circumstances, 10 to 12 tons per acre have been grown.

The stems of this plant grow to a considerable height, and their fibre might probably be found valuable for making paper; the leaves are stated to contain nitre. In the tubers a chemical substance is found, called Inuline, which is organised, according to Raspail, like common starch, but stands, to a certain extent, in opposition to that substance, which it replaces in the root system of the composition, and has not been detected in any other tribe. Iodine gives it a yellow tint. Inuline was discovered by Valentine Rose in 1804. The Jerusalem Artichoke multiplies very quickly, and is with difficulty cleared out the land where it has once been planted. It very seldom blossoms in this temperate climate; the flowers resemble a small Sunflower.—*The Garden.*

PRUNING ROSES

The great evil attending the pruning of Roses is that, in a great measure, the weak and the strong are pruned alike. This is not so much the fault of the pruner as that of those who have set themselves the task of teaching the art of growing Roses. Most of the books written on Roses advocate a severe system of pruning, and it would not be difficult to show that it has often caused the loss of many plants, while in others a weakly growth, which can never give a satisfactory crop of flowers, has been induced. As regards form, rosarians are not happy in their choice when they select the Standard. It is undoubtedly the most unsuitable of all forms for Rose trees that are expected to live and flourish for many years. Standards fail to give uninterrupted satisfaction, and then the Rose, and not the form in which it has been grown, suffers. This could soon be set right if the standard form was given up, and cultivators relied upon Rose trees upon their own roots, and at the same time gave up the pernicious system of severe pruning. We have just been examining a line of own-root Roses about five years old; these have not been pruned for two years, and last year they all made many shoots from 4 feet to 6 feet long. In spring, instead of cutting back these strong shoots according to the orthodox fashion, we bent and pegged them down to the ground, burying a portion of them a few inches under the surface, but leaving the point out of the ground. On a single branch of Gloire de Dijon we counted seventeen flower buds, and on such varieties as Marechal Vaillant and Jules Margottin the number of buds started on the branches bent down varied from seven to fifteen; whereas, if we had cut them down in the ordinary way, only two or three of the topmost buds would have started into growth. It is pleasing to see the bent branches bristling with new-made growth at every bud, from one end to the other, and it only requires a little calculation to show how great will be the increase of Roses.

And not only will the number of flowers be increased, but more space will be covered, and the original plant will gain force from receiving the assistance of an increased number of roots, which in a few months the bent-down branches will form at the points where they come in contact with the soil. In regard to own-root Roses, one frequently sees it stated that some varieties are so weak that they require to be worked on foster roots of a stronger character than their own—a statement not borne out by experience. At least, we find that when a variety constitutionally weak is worked on the Manetti or any other stock, it is not benefited thereby for more than two or three years. Except in very exceptional cases, dwindling away and dying in a few years is the condition of half the Roses on alien Stocks; while if we are patient with own-root plants, even weak growers will annually acquire strength and last long, provided always they are not pruned in a way likely to check growth instead of promoting it. If we want an illustration of the injurious effects of severe pruning, we have only to turn to the climbing varieties of Roses. Most of us can doubtless point to numbers of examples from twenty to thirty years old still in vigorous condition. Surely we can find in these enough to convince the most fastidious that all that is wanted is a proper balance between roots and branches, but which can never exist while we cut the branches hard back annually and leave the roots untouched. It may be said in justification of pruning that the character of the growth of the climbing varieties is different from that of Hybrid Perpetuals, and that therefore different treatment is needed. To a certain extent that may be true; but the present system of pruning standard and dwarf Roses goes to such extremes as regards cutting back that hardly a shade of comparison is left. We would seriously recommend those who are disappointed with the present condition of their Rose trees—especially those grown in the form of dwarfs—to let them grow in their own way for say two years, cutting off the tops of shoots which have flowered only. Which system gives the best results will then be seen.—*The Garden.*

THE COCO-NUT PALM.

Of the many important economic lessons taught us by the late International Forestry Exhibition held in Edinburgh, not the least was that appertaining to the numberless uses to which that family of the vegetable kingdom denominated Palms can be applied. Humboldt gives as the produce of this tribe, fibre, oil, wax, flour, sugar, and salt, and Von Martius, the great illustrator of this noble family of plants, adds thread, utensils, weapons, food, and habitation. The habit of growth and remarkable height, as well as its longevity and great fecundity, have been remarked upon by Xenophon, Strabo, Plutarch, Aulus, Gellius, and other early writers. Again some have expatiated upon their majestic appearance and the character of grandeur they impress upon the landscape of the countries they inhabit. In addition to all this, they are, in economic importance, the most interesting of the vegetable world.

Of the Coco-nut Palm, in particular, an exhibitor, Mr. J. Alexander (who furnished one of the features of the International Forestry Exhibition with the products from Ceylon), showed numerous uses to which this member of the noble family could be supplied—truly multifarious! From this gentleman we learned the fact that the market value of the area covered with this Palm alone in Ceylon is upwards of twenty millions sterling. The Cingalese native with twelve Coco-nut trees and two Jaca trees (Artocarpus integrifolia) in his garden, considers himself independent. The Coco-nut tree furnishes him with food, thatch for his house, oil for his lamp utensils for his kitchen, charcoal for his fire, sugar for his board, baskets to hold his fruit, buckets for his well, mat for his bed, pouch for his betel leaf, leaves for his books, fences for his garden, and brooms to sweep and clean up his house. We may safely say that no other tree could furnish such a supply of home comforts. It may be interesting to some readers if we give the various portions of the tree which provide these useful articles.

The following are only a few of the countless uses for which the various portions of this valuable tree can be utilized:—The leaves for roofing, mats, baskets, torches, fuel, brooms, fodder for cattle; midrib of leaf, fences, yokes, fishing rods, and many domestic articles; the Cabbage or unexpanded cluster of leaves, when very young as a vegetable, afterwards for pickles and preserves; the sap for toddy, arrack, vinegar, sugar; the unformed nut,

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medicine and sweetmeats; the young nut and its milk, for drinking and dessert; the green husk, preserves; the nut and milk, for eating, curry, milk, and cooking; the oil, for rheumatism, soap, candles, lights; koppara, or refuse of the nut after expressing the oil, for cattle and poultry; the shell of the nut, for drinking cups, charcoal, tooth powder, spoons, medicine, hookahs, beads, bottles, and knife handles; the coir or fibre within the outer husk, fuel, mattresses, cushions, ropes, cables, cordage, canvas, fishing nets, brushes, oakum, and floor mats; the trunk or stem, for rafters, laths, boats, troughs, firewood, &c., &c.

Tennent says with Cinghalese enthusiasm there is an interminable narrative of the uses and qualities of this his favourite tree. He also notices a claim in a case in a Ceylon Court for the *2,520th part of ten Coco-nut trees.* In Ceylon alone 460,000 acres are under cultivation of this Palm, the average value of the exported products of which amount to £500,000. The value of that locally consumed is estimated to be at least £2,000,000.

An approximate estimate of the area cultivated in the various countries where Coco-nuts are produced is 3,375,000 acres, of the enormous value of upwards of £15,000,000. The annual export value of the products amounts to £2,500,000. The following represent some of the annual exports as taken from the Government Blue Books :—

Exports from	India	£700,000
„ „	Ceylon	500,000
„ „	Australasia	200,000
„ „	Central and S. America	700,000
„ „	West Indies	100,000
„ „	Eastern Archipelago	300,000
„ Miscellaneous		100,000

—*Gardening World.*

TROPICAL FRUITS.

[*From the "Food Journal."*]

Not the least marvellous of the minor results accomplished by steam navigation may be witnessed any day in the streets of London. The quantity and variety of cheap tropical fruits offered for sale east of Temple Bar by our hardworking costermongers—fruits which, probably, only six or seven weeks previously were nodding and ripening under their native sunny skies, thousands of miles away—must have struck the critical observer with equal pleasure and astonishment. In the eyes of the Indian merchant emerging from Lombard Street, where he has been to pocket fat dividends, or to pay unwelcome calls, the fragrant whiff from the truck loaded with pine-apples and other gorgeous fruits may have no interest; yet the aroma must surely remind him of that glorious morning when he first landed at surf-defended Havannah, or obtained his earliest glimpse of the cliffs of Singapore. But the city clerk, just released from his daily toil, has no such associations; and he only sees before him, piled on the coster's barrow, a wealth of delicious and strangely shaped fruits.

It is no doubt a matter of astonishment to many where the hawkers obtain these fruits so regularly in season, and in such a comparatively good state of preservation. The cheapness, too, may be another reason for surprise. From several sources the intelligent inquirer may glean information. He may peep into the hold of a West India steamer, on its arrival, about the beginning of April, during May, and part of June; there he will see thousands of African pine-apples carefully packed, "heads and thraws," as our Scotch friends would say; the beams of the ship being festooned with clusters of plantains and bananas from the West. A few weeks later a superior pine-apple arrives from the West Indies, accompanied by better plantains and larger bananas, in time to fill up the gap before our own unrivalled strawberries so monopolise the market that tropical products would unheeded "spend their sweetness in the desert air."

During the season, which lasts pretty well from April to August, these fruits are sold by public auction on Mondays, Wednesdays, and Fridays, mostly by Messrs. Keeling and Hunt, the well known brokers in Monument Yard. Thither flock equally the greengrocer of high degree and the lowly costermonger—the purveyor for royalty or aldermanic feast, and the caterer for the million.

The prices obtained at these sales for homegrown pine-apples vary from 9s. to 12s. per lb., and for African and West Indian from 3d. to 3s. 6d. Costermongers are equally welcome at the sales with the largest dealers, as they invariably pay cash before delivery. The costers, especially those who have acquired the delicate art of producing wonderfully attenuated slices, make large profits; but as undesiccated fruits pay no duty, it is almost hopeless to arrive at a correct estimate of the quantity annually sold.

The common pine-apple is essentially a tropical plant. It is found wild in America, and in the East and West Indies. Without exception, it is the most luscious fruit grown in England, and its artistic outlines, added to its gorgeous hues, have from an early period rendered it a favourite with the horticulturist, and the artist engaged in designs for drapery—more especially those connected with the Paisley shawl manufactory. Excepting the Burmese pines, and probably the fruit reared at Singapore, which rarely reach our market, the most notable specimens are the produce of this country.

VARIORUM.

"Ou Ay."—A stranger, passing along a road in the south of Scotland, was surprised at the perfect solitude in which he found himself. Coming to a poor man who was breaking stones by the wayside, he asked him if the road was well frequented. "Ou ay," said the man, "it's no that ill; a cadger gaed by yesterday, and there's yoursel' the day."

Deseaving the Baste."—"I engaged," says a tourist, "a chaise at Galway to conduct me some few miles into the country, and had not proceeded far when it pulled up at the foot of a hill, and the Irish driver coming to the door, opened it. 'What are you at, man? This isn't where I ordered you to stop'—'Whisht, your honour, whisht!' said Paddy, in an under tone; 'I am only deseaving the baste. I'll just bang the door; he'll think yer out, and then he'll cut up the hill like Old Scratch,—see if he don't.'"

Punch.—A certain French gentleman, who had only just arrived in England, was invited to a friend's house, where a large bowl of punch was made,—a liquor he had never seen before, and which did not at all agree with him. Having forgotten the name of it, he asked a person the next day, "What dey call dat liquor in England, which is all de contradiction?—where is de brandy to make it strong, and de vater to make it small, de sugar to make it sweet, and de lemons to make it sour." "I suppose you mean punch," answered the other." "Ah, ponche, begar!" cried monsieur—"it almost ponche my brain out last night."

A Shareholder's Answer to a "Call."—The secretary of an Indian gold-mine, having sent an imperative demand to a certain shareholder for the payment of a "call," received, says *St. Stephen's*, the following reply—"Dear Sir,—I have your letter of this date, and note that your directors propose to proceed against me. Your prospectus stated that one of the objects of your company was to 'seek, win, and work gold in India and elsewhere.' Things not turning out well in India, your directors apparently consider it their duty to seek, win, and work gold 'elsewhere'—i. e., out of me, I can assure you, however, that I am not in an auriferous vein; the only lode I possess is a load of debt, and, as a gold-mine, I shall be a failure. Your prospectus estimated a yield of one ounce of gold per ton on thirty thousand tons of quartz crushed per annum—£10,500 sterling per annum. You may 'crush' me, but you will find that I will not yield nearly so much. My person (which, for the purposes of this calculation, may be considered quartz) weighs, roughly speaking, ten stone, and, if crushed immediately, I estimate that it would yield as under—Gold *nil*, silver 3s., copper 4½d.—total 3s. 4½d. Deduct cost of crushing—say, £5 5s. Yours faithfully,——."

A Distressed Maid.—A correspondent of the *Times* relates a romantic incident which has recently occurred in a prosperous London suburb. A devoted

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young High Church curate of interesting appearance and great popularity in his district was waited upon by a young lady of considerable attractions, but with an air of deep melancholy, and clad in a somewhat ascetic garb. After some confusion and the shedding of a tear, she revealed to him that she had ventured to visit him on a matter deeply affecting her happiness—she feared, her life. The matter however was one of such deep importance that she could not impart it except at her own abode, where she adjured him, as her spiritual friend, to visit her. The reverend gentleman promised to do so, and the next day he called at the address given him. Then the young lady revealed to him the fatal secret. She had conceived a deep, a passionate love for the curate himself. She knew, she said, that her passion was hopeless; he, in his devotion to the Church, for which she loved him all the more, had vowed himself to a life of celibacy, and she would resignedly carry her attachment to the grave, which she felt was not far off. But there was one kindness which it was in his power to grant her, the remembrance of which would bring consolation to her dark and weary path. Would he, before they parted for ever, give her one kiss? After some timidity and agitation, the young curate, touched with pity, complied. The lady shed another tear, bade him adieu in a hollow voice, and he departed. A few days afterwards he received a neat little parcel gracefully tied with a piece of blue ribbon, and on opening it, found an instantaneous photograph (cabinet-size) of himself kissing the young lady. Accompanying this was a communication from the fair creature herself that there were eleven more copies and that he might have the whole dozen at twenty pounds a piece. Negotiations on the subject are said to be proceeding.

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THE CULTIVATION OF ANNUALS.

The many beautiful varieties of Annuals available for the decoration of our gardens are worthy of a much more extensive growth and a better cultural treatment than they generally receive in this country, and when well grown will produce flowers of a size and brilliancy that will surprise many who are only accustomed to the weedy half-starved representatives so frequently seen in our gardens. Although Annuals will thrive fairly well in almost any soil or situation, some little preparation of the ground is necessary to grow them to perfection, and the first consideration is to reduce the surface to a fine and even tilth, and if the soil is poor working in a liberal quantity of well-decayed manure. For a general display, perhaps, the best time for sowing is about the middle of October, and for a later succession, early in November. Regarding this, however, it is impossible to lay down any fixed rule, much depends not only on the season, but also the locality; for instance, Larkspurs and Nemophilas in the North-West Provinces germinate freely if sown immediately after the cessation of the rains, but in Lower Bengal they can rarely be induced to do so before the middle of November, that is after the cold season has fairly set in. Nothing is gained by being too early, and frequently much is lost. An American writer on this subject says:—"Wait a little longer, is a safe maxim to guide amateur gardeners. The seedsman is often blamed for selling *un-vital* seed when the fault has been the 'previousness' of the planter. The grave uncertainties incidental to the germination of seeds at all seasons, are increased ten-fold under such conditions. A delay of a week may make all the difference between success and failure. Do not risk your time and labour by hasty seeding; or if you are tempted to sow at an unseasonable period, do not blame the seedsman for selling seeds that will not grow."

After sowing, the cultivation of Annuals raised in the open ground is extremely simple. An early and vigorous thinning out of the clumps or patches being nearly all that is necessary to ensure an abundance of fine plants with a profusion of handsome flowers. Various methods are adopted in sowing, but perhaps the simplest and best plan for garden decoration is to sow in shallow furrows in circles of from twelve to eighteen inches in diameter, or in rows or drills, their distance apart to be regulated according to the height of the plants when fully grown. When this is done in dry weather an excellent plan is to fill the drills with water and allow it to settle before sowing, carefully covering the seeds with the soil removed by the operation and pressing down firmly with a trowel or a spade. Such large seeds as Nasturtiums, Lupins and Sweet Peas may be covered to the depth of an inch, Convolvulus Major not quite so deep; smaller seeds, such as Mignonette, &c., require but a slight covering, whilst very small seeds should be thinly scatter-

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ed on the surface and gently raked in. Annuals may also be sown broadcast in mixture in beds or patches in waste places, shrubberies &c., and have a very pleasing effect. The most useful soil for raising plants from seeds in pots is composed of about equal parts of good rich loam, leaf mould and well-decayed manure, thoroughly incorporated with a sufficiency of coarse sand to render the whole fairly porous. In filling in pots, pans, &c., with soil, it is of the first importance, after providing ample drainage, that the soil should be pressed down firmly before sowing the seeds, which will have the effect of providing a much more even moisture and certainty of germination than can be had by sowing in a loose and porous surface. Sow the seeds thinly, distributing as evenly as you can, and cover as lightly as possible with a sprinkling of fine soil, and after submitting them to a slight pressure, gave them a gentle watering and place in a shady position, covering them either with mats, canvas, or any similar material till they have germinated. We know that this practice is opposed to the ideas of many experienced gardeners, who will not be convinced that light is in no way essential to induce germination, but has, on the contrary, a retarding effect; such is, however, undoubtedly the case. Mr. H. Cannell, who is probably the most successful raiser of Florists' Flowers in Europe, says:

"Sow your seeds in the usual way, only cover up and keep in total darkness until they begin to peep above the soil, then gently and gradually expose them to light. All this is so feasible that every sensible person will at once and for ever adopt it, and the success of all good seed will follow and become a lasting practice and benefit. For years past excellent treatises have been written, practical men have adopted shading their seed-pans with paper, and others with a glass vessel of water, various coloured glass, &c., all of which but slightly approach this system, and why it has not become a general practice long since we are wholly at a loss to say. The advantage and success of this system is so apparent that it only requires to be once known to become universally adopted; first, when a frame, pot or pan is covered completely, it ensures one uniform moisture and temperature; consequently every seed possessing the merest life will be sure to grow, and also save that continual watching—so necessary in the old style—and lessen to a minimum the anxiety of raising valuable seed."

When the plants have reached a size at which they can be handled, the choicer varieties should be carefully pricked out into pots, pans or boxes, shading them till well established and then gradually inuring them to the sun. This will enable them to make strong sturdy plants, with plenty of roots that will transplant well and produce an abundance of handsome flowers.

Non-Germination of Seeds.—Many and various causes tend at times to retard the growth or germination of seeds, as, for instance, too much wet with too low or too high a temperature; and, as is often the case with small seeds, their being covered too deeply. One of the greatest sources of failure, however, consists in sowing in ground but freshly broken up, or too loose and open, and not sufficiently firm to retain an even moisture,—a condition which is of the first importance in the successful rearing of all kinds of plants from seed. Freshly dug, or very light and loose soil, when seeds are sown in it near the surface, very often contains but just sufficient moisture to start the germ of the seed into growth; and if the weather is at all dry, as frequently happens, this surface moisture rapidly evaporates, and the soil becoming dry below the seed before the young root has had time to push its way down, the embryo plants at once perish, and the seedsman is but too often held in fault for a needless failure. Unless very heavy or clayey, ground cannot be made fairly too firm for seed sowing, and whether sown in pots, pans, or boxes in the greenhouse, or on seed beds, &c., in the open ground, a firm bottom should at all times be secured. In sowing seeds out of doors, freshly broken-up ground, if of a heavy or retentive nature, should be made more firm by beating down with a spade, &c.; if very light and open, it should be trodden down firmly with the foot, and in either case raked level before and after sowing seeds. This process will ensure an even and moist surface, a free germination, and, in very many instances, serve as a preventive of unnecessary disappointment.

Arrangement and Contrast of Colour.—In arranging flower beds or borders, the dwarfer kinds of Annuals should be placed on the outer edge and the taller varieties in succession in the back ground, so that the whole may present a gradually sloping surface, and their distance apart must be so regulated that they are all seen and fully exposed to air and light, their brilliance and effect depending much on this and the harmonious arrangement of colour. Never place two patches of similar colour in close proximity, but contrast one colour with another of corresponding intensity, as orange with purple, scarlet with blue, and light rose or pale blue with white. As white contrasts well with almost every shade of colour except yellow, it cannot well be introduced too frequently to relieve and vary the intensity of the more brilliant varieties.

Transplanting.—This should always be done if possible in moist cloudy weather, but should it be hot and sunny, seed-beds, pots, &c., should have a liberal watering before the plants are removed, taking care not to let the young roots or fibres get dry by too long exposure to the sun and air. Water immediately after planting, and shade from the sun till the plants are established. It is an excellent plan to cover each plant with a small flower pot during the day, removing it at night; by this system transplanting may take place with safety in the hottest weather.

Looseness of Surface.—The value and importance of frequently stirring the surface soil cannot fairly be overestimated in its beneficial results to all kinds of garden crops and flowering plants. The soil should never be allowed to cake or harden, but after rain or watering should be carefully gone over, and the surface broken or loosened with some such implement as a trowel or hoe, and the slight admission of air thus obtained will give a great impetus to the growth of the plants.

Prolongation of the Blooming Period.—In most kinds of Annuals the time of flowering may be considerably lengthened by carefully picking off the seed pods or vessels when the flowers are past their best, or beginning to decay. This prevents the plants ripening seeds and induces a continuance of blooming and vigour.

Liquid Manure and Watering.—Liquid Manure, when judiciously applied, is very beneficial, especially to plants whose roots are confined, as in pots, &c., but should never be given to very young plants or oftener than twice a week, and then not in extravagant quantities. An

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excellent Liquid Manure can be easily made by filling an old tub about half full of old cow-dung or horse-droppings, fill up with water, and stir occasionally a day or two before using, and fill up with fresh water from time to time as the liquid is used, till the quality is exhausted. *Soot* also makes an excellent manure when mixed in the proportion of six quarts to a hogshead of water. *Guano Water*, made by adding one ounce of guano to about six gallons of water, is highly stimulating to most kinds of flowering plants and bulbs. All seeds when sown should have a gentle watering with a fine rose water-pot, and on no account should they be allowed to become dry when germination has once commenced. Plants in pots should only be watered as often as the surface of the soil becomes dry, and not daily or periodically, regardless of the state of dryness, as is erroneously practised by some amateurs, to the frequent injury and sometimes destruction of the plant.

Editorial Notes.

De Candolle calls attention to the fact that a branch of a coffee-tree, preserved in a solution made by boiling water with about seventeen per cent. of common salt, retained its green colour for fifty-three years.

A resident in California has this season gathered ripe tomatoes from the top of a twenty-foot ladder. The vine, which is twenty-five feet high, was trained on the sunny side of the house, and showed blossoms and fruit in every stage of growth.

Mr. I. E. Johnson, St. George, Utah, finds from continued experience that Mignonette is the most valuable plant for bee-pasturage—blooming early and continuing till nipped by frost—and considers that a well-cultivated acre of it would give abundant employment all through the season for as many as five hundred swarms.

Dr. Voelcker says that the brown-coloured sulphate of ammonia obtained from the products of the gasworks frequently causes injury when applied as a top-dressing. This is due, he finds, to the presence of highly poisonous cyanogen compounds. Consequently he recommends that all manurial materials from gasworks should be tested before use.

To bleach ferns, take one half-pound of chloride of lime and one pound of washing soda, add three pints of water to the lime, and five pints to the soda, in separate vessels; let each stand twenty-four hours; then pour them together, and a fluid resembling milk and water is the result. Allow to settle—pour the clear liquid over the ferns, and let them air until bleached: then take them out, put them in cold water for two or three hours, take them out upon paper like seaweed, and press them after they are a little drained.

To Destroy Wasps.—Make a strong solution of cyanide of potassium; soak a piece of lint, four or five inches square, with the solution, and lay it close to the entrance of a wasps' nest during the bright hot part of the day; according as the wasps return home they will alight on the lint and very soon die. If the nest be in a tree, hold the soaked lint with a tongs or split stick close under it, late in the evening, when the wasps are at home for the night. Soon the wasps will fall out in a shower dead. Avoid inhaling the vapour, and be careful in touching this deadly poison.

Water and the Surface of the Earth.—Water, Professor Huxley tells us, is the most active, permanent, and apparent of the agencies by which the surface of the earth has been brought into its present form, and by which that form is constantly, though by imperceptible steps, moulded and modified. Water, flowing or frozen, has actually brought into their present places—nay, has in great measure reduced to their present state—the materials of the visible soil. The superficial soils sustaining vegetation and life, and covering those rocks or strata which may be called the dry bones of the earth's skeleton, have been for the most part washed into their actual place, and worn down into their present condition, by the agency of water.

Japanese Floriculture.—Japanese floriculture is famed for its success and quaintness, and American flower-lovers are now making collections of Japanese plants. A gentleman in San Francisco owns two hundred of these plants, all evergreens, which curiously illustrate native skill, the trees being dwarfed and trained into various shapes, such as those of cats, dogs, cranes, turtles, cocks, sparrows, etc., the favourite design being a cocked hat. Some of the trees, though dwarfed to only a foot high, retain their natural shape, and look like full-grown trees seen through the reversed end of an opera-glass, while many are fifty years of age. Most curious however are the two tea-plants, the leaves of which sell at from £1-8s. to £2 per pound in Japan, grasses growing in long cords with tassels, and houses, pleasure-boats, and junks made out of some porous root in which plants can live. The latter are covered with little plants so dwarfed as never to grow out of proportion to the object which forms their base. Some of these floral curiosities are very old, having been handed down from father to son for many generations, while they grow in valuable specimens of ancient Japanese pottery.

The Apple.—Of all fruits the apple has the longest pedigree, and by far the most profoundly important history. No higher title could be found for the goddess of fruit herself than Pomona, the apple; and we earthlings, to this day, have no stonger word by which to describe some most precious treasure—"The 'apple' of the eye." Golden apples formed the nuptial present given by Juno to Jupiter, which the daughters of Hesperus had to watch; and which Hercules, after slaying the guardian dragon, carried off, and so effected the most arduous of all his achievements. By the award of an apple Venus was proclaimed goddess of beauty for all time. By means of an apple, Tell was stimulated to free his country from the oppressor. Even Sober science owes some of her greatest triumphs to this fruit, for did not the falling of an apple reveal to her the law of gravitation? Whether these considerations had weight in the matter it would be hazardous to say, but of late special attention has been given by German horticulturists to the apple, and experiments have been made with noteworthy results. One learned professor has shown that by excising the seeds of an apple at a particular period of its growth, the fruit may be greatly increased in size, and improved in its flavour. Much care must, of course, be given to the operation; but all trouble is repaid with interest. The apple, it need not be said, becomes unproductive after the operation. This, however, is only of the slightest importance. What interests the world is that this fruit, already supreme, is capable of being greatly improved. In the collection of the Royal Horticultural Society of England there are more than 1,500 varieties of the apple Many are not worth cultivation, but among them, although two or three American varieties run them close, are the finest in the world. It is these that will have to be selected for this new process.—*The Agricultural Gazette.*

A Laughing Plant.—This is not a flower that laughs, but one that creates laughter, if the printed stories of travellers are to be believed. It grows in Arabia, and is called the laughing plant

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because its seeds produce effects like those produced by laughing-gas. The flowers are of a bright yellow, and the seed-pods are soft and woolly, while the seeds resemble black beans, and only two or three grow in a pod. The natives dry and pulverise them; and the powder if taken in small doses makes the soberest person behave like a circus clown or a madman; for he will dance, sing, and laugh and cut the most fantastic capers, and be in an uproariously ridiculous condition for about an hour. When the excitement ceases, the exhausted exhibitor of these antics falls asleep; and when he awakes he has not the slightest remembrance of his frisky doings.—*Vick's Floral Magazine* (American).

THE MILK OF THE COW-TREE.—Alexander Humboldt remarks that among the many very wonderful natural phenomena which he had, during his extensive travels, witnessed, none impressed him in a more remarkable degree than the sight of a tree yielding an abundant supply of milk, the properties of which seemed to be the same as the milk of a cow. The tree itself attains a height of from forty-five to sixty feet, has long alternate leaves, and was described by Linden as *Brosimum galactodendron*. The milk which flows from any wound made in the trunk is white and somewhat viscid; the flavour is very agreeable. M. Boussingault has given a detailed analysis, the samples analysed having been some of those sent to the Paris Exhibition, and concludes by stating that this vegetable milk most certainly approaches in its composition to the milk of the cow; it contains not only fatty matter, but also sugar, caseine, and phosphates. But the relative proportion of these substances is greatly in favour of the vegetable milk, and brings it up to the richness of cream, the amount of butter in cream being in about the same proportion as the peculiar waxy material found in the vegetable milk, a fact that will readily account for its great nutritive powers.

APPLICATION OF MANURES.—Among gardeners and farmers there is a growing realisation of the fact that in the application of artificial manure especially, a more intelligent and practical system must be followed. The waste attending the indiscriminate method of giving the same kinds of manure to all sorts of crops is beginning to be understood, to some extent at least, and to those who are working so earnestly to this end all credit is due, if they are a little over-zealous at times. Where ordinary farmyard manure from all sources is used, it is perhaps not of so much consequence under a judicious system of rotation of crops, but it will not do in the case of expensive artificial manures, which are becoming more extensively used every day, and when even our large corporations are turning their attention to their manufacture and sale on an extensive scale. Until we realise fairly that plants, like animals, need different kinds of foods, or at least different proportions of the same food, we shall not be able to feed them properly or economically. Both plants and soils vary in their wants in this respect, and it is really an analytical knowledge of both that is required by the gardener and farmer more than anything else. It is not prepared manures that the cultivator wants so much as a recipe for their preparation, in order that he may be able to make them himself to suit his purpose, if such a thing be practicable, which may perhaps be doubted. At present there is nothing connected with gardening concerning which the gardener is so much in the dark, for in the application of many manures he really does in many cases not know whether he is doing right or wrong. A handy book on this subject would be of much value. The wants of cultivators are not so varied or complicated that they might not be provided for that way. It seems too much to expect either the gardener or farmer to become a walking cyclopædia of chemistry, geology, and physiology, with the object of cultivating a few rods or a few acres of land, and still fewer crops; it is not worth his while. "Johnstone's Agricultural Chemistry and Geology" is good in its way, but not popular; probably not one farmer or gardener in a thousand ever heard of it.—*The Garden.*

A NEW FRUIT TREE—Baron von Muellar informs us of the discovery of a new fruit tree called by him *Bassia Erskineana*, and a native of South-Eastern New Guinea.

"For many years," writes the Baron, "it has been known that in the south-eastern parts of New Guinea a tree exists, which affords a fruit so wholesome and palatable that it is largely consumed not only by the natives, who know it as Posi-Posi, but also by the European and other settlers. It is said to have a flavor like that of the pear, but quite distinct. Hitherto no means were available of tracing this fruit to the particular species of tree affording it. My wish to obtain full material for placing this highly useful plant on phytographic record having been rendered known to the worthy Missionaries of New Guinea, I was recently supplied with flowering and leafy branchlets and also seeds of the tree in question by the Reverend Wm. Wyatt Gill, and thus I am now enabled to offer a diagnosis of this interesting species, which promises to become important for tropical culture.

Bassia Erskineana.—A tree attaining a height of 60 feet. Branchlets robust, glabrous; leaves large, crowded at the summit of the branchlets, ovate-lanceolar, glabrous, bluntly acuminated, narrowed into a short stalk, very spreadingly veined, faintly reticular-venulated; flowers in terminal almost umbelliform fascicles, very numerous; stalklets not much longer than the flowers; calyces rather small, several times shorter than the corolla, four-cleft to the middle, as well as the stalklets, brownish, silky-hairy, its lobes almost semi-orbicular, slightly pointed, the two inner broadly membranous towards the margin; corolla white, eight-cleft; its tube not very turgid, somewhat silky outside; its lobes almost ovate, narrowed towards the base, and there ciliolated and somewhat bearded; stamens sixteen; filaments densely short-downy, about as long as the anthers, the latter somewhat silky-downy at the back, the blunt protruding portion of the connective short-bearded; style and ovary glabrous; fruit large globose; seeds large, oblique-ovate, somewhat compressed; testa crustaceous, rather brittle, dark-coloured, not shining; umbilical area cymbiform, occupying about one-third of the surface of the seed.

"Two other congeneric trees with esculent fruits are likewise known from New Guinea—namely, Bassia Cocco, the "Nate" of the aborigines, a species bearing only small fruits; then Bassia Macklayana, the "Dim" of the natives, which has globular fruits of fully 5 inches diameter with copious pulp.

"New Guniea is almost sure to yield, from some of its Bassias and other sapotaceous trees, new sources of gutta-percha."—*Gardeners' Chronicle.*

Original Articles.

THE ROSE.

HYBRID PERPETUAL ROSES.—(*continued.*)

In the foregoing groups we have briefly noticed the best known and most popular kinds in each section, we will now endeavour to give a descriptive list of the leading members of this large family. In compiling this, our aim has been to include only those of proved sterling merit, both new and old. There is no questioning the fact that, taken as a body, there is a vast improvement year by year in the new varieties introduced, not only in colour and form of flower but also in the habit of growth, (a point too often lost sight of in the selection of varieties). On the other hand it must also be admitted that amongst the older kinds there are gems of the purest water, take for instance Paul Neron, Marie Baumann, Senateur Vaisse or Xavier, Olibo. If weexcept A. K. Williams, and perhaps Mervielle de Lyon, has there been a single new variety introduced during the past ten years to equal them in their respective classes?

In the column describing the habit of growth the following abbreviations are used:—

Vig.—for vigorous, being varieties which form large heads, and produce long vigorous shoots, nearly all of which are adapted for Pillar Roses.

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Rob.—robust, varieties which produce long shoots and large wood ; these form good Standards, and some of them good Pillar Roses.

Free—varieties which are very good growers, forming fine full-sized plants.

Mod.—moderate, these are compact, yet good growers, although they never make large heads.

Dwf.—dwarf, are mostly dwarf delicate-growing sorts, which should only be grown as dwarfs.

The letter S is affixed to all the finest Show Roses ; these may be depended on as being the best and most constant for the purpose of exhibition.

The letter P indicates those varieties which are best adapted for Pillar Roses.

Name.	Description.	Habit of Growth.
Abel Carrière	S dark velvety crimson, colour of *Prince Camille de Rohan*, large and well formed, good shape, and one of the best dark Roses	vig.
Abel Grand	S clear silvery pink, flowers large, full, and well-formed ; a good Rose, and very sweet	vig.
Admiral Seymour	S deep velvety purplish red, flowers large and full	vig.
Æjeria	S beautiful bright rosy pink, very large, full, and well formed	vig.
A. G. St. Hillaire	S bright crimson, flowers Camellia-formed, dwarf habit ; a good Rose	vig.
Alfred Colomb	S brilliant carmine-crimson, flowers very large, full and globular ; superb	rob.
Alfred de Rougemont	very rich deep velvety crimson, flowers medium size, smooth, beautifully formed, double	mod.
Alfred K. Williams	S fine carmine-red, large, full, and imbricated ; one of the most beautiful and perfect	vig.
Alexandre Dupont	Purple velvety red, shaded with crimson, very large	vig.
André Gill	Bright carmine-red, large, full well formed, globular	vig.
Antoine Chantin	Dark cherry-red, edge of petals whitish, flowers large, full and well formed	vig.
Alphonse Soupert	Pure vivid rose, the flower in the way of *La Reine*; in theway of *Jules Margottin*	vig.
Alice Dureau	S rosy lilac, centre deep red rose, flowers very full, globular, very fine and sweet-scented	vig.
A. M. Ampère	purple-red, with bluish reflex, medium size, full, cupped	vig.
Amicet Bourgeois	bright cherry-red, large, full, cupped, blooming in clusters	vig.
Anna Alexieff	P fresh rosy pink, a good and abundant blooming Rose	free.
Annie Laxton	S deep rose, beautifully shaded with cherry-crimson ; very early	free.
Annie Wood	S brilliant crimson-scarlet, flowers double and perfectly imbricated ; a first-rate Rose	vig.
Antoine Ducher	S very rich crimson-rose, large smooth thick petals, flowers large, full, deep, and well formed	mod.
Archiduchesse Elizabeth D'Autriche	fine pink-rose, very large, full, free flowering	vig.
Auguste Neumann	S rich velvety crimson and violet-purple, very dark, and colour stands well, full and of good size ; a good Rose	mod.
Auguste Rigotard	S clear brilliant crimson, petals large, even, and smooth, flowers cupped ; a fine Rose	vig.
Avocat Duvivier	S deep purplish red, very large, full, and perfect	vig.
Baron de Bonstettin	S rich velvety purple, in the way of and similar to *Monsieur Boncenne* ; a fine Rose	vig.
Baron de Maynard	P pure paper-white, flower of moderate size, full and well formed	mod.
Baron Haussmann	S clear carmine-crimson, flowers of good size, beautifully imbricated and full ; a fine Rose	vig.
Baronne Prévost	P brilliant rose, very large and full ; forms a fine Pillar	vig.
Baroness Rothschild	*See Madame la Baronne de Rothschild.*	
Barthelemy Joubert	S bright cherry-red, large and full ; fine	vig.
Baron Nathaniel de Rothschild	Bright crimson-red, large, full, fine form	vig.
Beauty of Beeston	fine brilliant velvety crimson, a dwarf-growing *Charles Lefebvre*, but not so full, foliage fine ; very free flowering, and sweetly scented	
Beauty of Waltham	S cherry-crimson, petals large and well disposed, flowers cupped, large, and finely formed, very sweet	free.
Bessie Johnson	S blush-white, flowers very large and full, and highly fragrant ; a good light Rose	vig.
Boildieu	bright cherry, very large, full globular flowers	rob.
Boule de Neige	P pure white, centre delicately shaded with cream, flowers of beautifully imbricated form ; a good white Rose,	vig
Brightness of Cheshunt	S peculiarly vivid brick-red, a medium sized flower of open imbricated form, very free,	
Calliope	S centre beautiful bright pink, outer petals paler ; long handsome buds, very large and full ; fine and distinct	
Camille Bernardin	S bright red, beautifully formed, large, full, and deliciously sweet	
Captain Christy	S blush, centre delicate flesh colour, flowers large, full, and beautifully formed ; a superb Rose	mod.
Capucine Liabaud	capucine-red, medium size, double	vig.
Catherine Bell	flowers very large, deep rose, back petals delicate silvery pink, and very fragrant, vigorous climbing habit	vig.
Centifolia roses	S rich rose-pink, flowers large and cupped, a very distinct and beautiful Rose, with abundant foliage	vig.
Charles Darwin	S deep crimson, with a brownish tint, and slightly shaded with violet ; a good bloomer and thoroughly distinct	
Charles Lefebvre	S P rich velvety shaded crimson, smooth thick petals, flowers extra large, quite full, and most beautifully formed ; a superb Rose	vig.
Charles Rouillard	P pale rosy peach, changing to pale lavender-rose, flowers cupped, large, full, and exquisitely formed	vig.
Charles Fanquet	scarlet-red, large full, well formed	vig.
Climbing Chas. Lefebvre	P a wonderfully vigorous sport from that superb old Rose *Charles Lefebvre*; producing shoots 8 to 9 feet in a season; as a crimson perpetual climbing Rose, this is a great acquisition	vig.
Climbing Jules Margottin	P a sport from *Jules Margottin* ; flowers exactly similar to its parent ; a free and vigorous climbing habit ; not in a robust form, but branching as freely as an evergreen climbing Rose	vig.
Climbing Victor Verdier	P bright cherry red, strong climbing habit ; a good pillar or climbing Rose	vig.
Clothilde Rolland	pinkish rose, colour clear and good, flowers of moderate size, well filled and nicely imbricated, fine globular form	vig.
Clovis	S violet-red shaded, distinct and good	vig.
Colonel Felix Breton	velvety grenata-red, large and full, regularly imbricated form, a new colour,	vig.
Comte de Mortemart	SP fine clear rose, of very large size, full, in the way of *Centifolia*, beautiful circular shelled form ; a very distinct variety in every way	vig.
Comte Frederick de Thun Hohenstein	deep crimson, shaded with carmine, large, full, and fine form	vig.
Comte Horace de Choiseuil	S vermilion, lighted with velvety scarlet, shaded, large, full, imbricated form	vig.
Comte de Flandres	purple-red, large, full, well-formed ; a seedling from *Madame Victor Verdier*	vig.
Comte Adrien de Germiny	S bright rose, large, full, well formed, imbricated ; a seedling from *Jules Margottin*	vig.
Comtesse Henriette Combbs	bright rose, with silvery reflex, large, full, in the way of *Marie Baumann*	vig.
Comtesse de Paris	S very bright clear red, and of fine form ; a good Rose	free
Comtesse Cecile de Chabrillant	S beautiful satin-rose, flowers very compact and perfect, superb, very sweet	free
Comtesse de Camondo	S fine bright rose, shaded with violet, very large, full, imbricated form ; extra	vig.
Comtesse de Serenyi	S blush centre, beautifully shaded rose, cupped and perfectly formed ; one of the best light Roses	vig.

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Name.	Description.	Habit of Growth.
Comtesse Nathalie de Kleist	coppered red, reverse of petals carmine, a new colour; large, full, cupped	
Comtesse de Casleja	rich deep scarlet, large, full, perfect imbricated form; opens freely. first class variety. A seedling from *Alfred Colomb*; is quite as good, but a different colour	vig.
Comtesse de Mailly-Hesle	flesh colour shaded, large, full, well formed;	vig.
Comtesse de Paris	bright rose, large, full, globulous, well-formed	vig.
Constantin Fretiakoff ....S	flowers very large, very full, well formed, beautiful brilliant cerise-red, much deeper in the centre; a superb Rose and sweet scented	vig.
Countess of Oxford ....S	carmine, with soft violet shade, velvety, flowers large, full, and cupped, petals smooth; a fine Rose	vig.
Countess of Roseberry....S	flowers brilliant carmine-rose, large, full, and finely cupped; a vigorous-growing variety, blooming freely all through summer and autumn	vig.
Crimson Bedder, introduced, 1874	as a crimson bedding Rose this variety surpasses every other for brilliancy of colour and continuous blooming; its habit of growth is moderate, and shoots short-jointed, producing a mass of flowers the whole season; colour scarlet and crimson, very effective and lasting, clean glossy foliage and free from mildew:	mod.
Crown Prince ....S	flowers bright purple, the centre shaded with lurid-crimson, very large and double	
Dean of Windsor... ....S	clear rich vermilion, sometimes slightly shaded with crimson, large, full, and good symmetrical form; free and constant	mod.
Devienne Lamy ....S	deep carmine a large full flower of imbricated form; a very fine Rose	mod.
Dingée Conard ....S	rich velvety crimson, a well-formed compact flower, fine even petal, and good high centre; a fine dark Rose	mod.
Directeur Alphand	deep blackish purple, large, full, well formed	vig.
Docteur Andry ....S	rich rosy crimson, flowers large, fine smooth petals; a superb Rose	free.
Docteur Baillon	bright crimson-red, shaded with purple, large, full and well-formed	vig.
Dr. Hogg P	deep violet, nearest to the blue colour sometimes desired in Roses, pretty shell-shaped petal, and very hardy	vig.
Dr. Hooker. S	deep crimson and velvety purple, good petals, large, even, and well-formed	vig.
Dr. Sewell. ....S	brilliant crimson-scarlet, shaded with purple, back of petals bright red, large, full, and finely cupped	vig.
Duc de Montpensier S	rich velvety crimson, flowers large, full, and well formed; a superb Rose	mod.
Duc de Rohan S	fine brilliant carmine, superb colour; a good old Rose	vig.
Duc de Wellington ....S	rich velvety crimson, flowers good size, cupped and well formed; a first-rate Rose	mod.
Duchesse de Caylus....S	glowing rosy crimson, flowers large, full, and beautifully cupped, with high centre and fine outline	free
Duchesse de Vallombrosa...S	blush, centre delicate flesh, flowers large, full, and cupped; an exquisitely formed and beautiful Rose	vig.
Duchess of Bedford....S	flowers dazzling light scarlet-crimson, large, full, and of perfect globular shape	
Duchess of Connaught....	dazzling crimson, shaded with dark velvety purple, highly perfumed, free bloomer	mod.
Duchess of Edinburgh....S	pale rose, flowers large and globular; a well formed flower, but not constant	vig.
Duke of Albany....	flowers vivid crimson when first opening, changing to a darker shade of colour as they expand, very large and full	rob.
Duke of Connaught....S	velvety crimson and purple, rich deep colour; compact, well formed, and a very good Rose	mod.
Duke of Edinburgh....S	rich velvety crimson, shaded, flowers large and very attractive; a superb Rose	vig.
Duke of Teck....S	bright crimson-scarlet, clear and distinct, in the way of *Duke of Edinburgh*	free
Dupuy Jamin ....S	brilliant carmine crimson, colour very fine, petals large, broad, and smooth, flowers well formed, luxuriant foliage; a good Rose	vig.
Earl of Pembroke....	colour very soft velvety crimson, enlivened on margin of petals with bright red.	
Eclair	bright fire-red in the way of *Charles Lefebvre*	vig.
Edgard Jolibois....	velvety-scarlet, shaded violet, flowers large and very double;	vig.
Edouard Morren....S P	brilliant glossy pink, very large; a magnificent Rose	rob.
Edouard Pynaert ....S	deep crimson, shaded violet, compact, well-formed even flowers; very fragrant	vig.
Elie Morel....S	lilac-rose, flowers very large, full, and of very fine form; a beautiful Rose	free
Emilie Hausberg ....S	light rose, changing to pale satin-rose, large and full, exquisitely formed	vig.
Emily Laxton ....S	a large full flower with globular pointed buds, flowers large and well formed; a good Rose	vig.
Empereur de Brésil....S	red, shaded with blackish violet, very large and very full	vig.
Empress of India... ....S	dark crimson and purple, well formed, moderate size	vig.
Ernest Prince....S	clear red, deeper in the centre, very large, well formed and globulous	vig.
Eugene Appert ....P	bright scarlet and crimson, colour superb; a fine pillar Rose	rob.
Exposition de Brie .... S	rich glowing crimson, flowers large and of good form; very fine	free.
Ferdinand Chaffolte....S	deep velvety crimson, colour very bright and beautiful, flowers large and full, outer petals smooth and shell-shaped	
Fisher Holmes....S	rich purplish crimson, flowers large, cupped, double, and of fine imbricated form; a superb Rose	free.
Fontenelle ....P	dark velvety crimson and purple, very large and full, blooms in clusters	vig.
Francois Courtin....	purplish cerise, outside rose with white stripes flowers large, full, and of a fine cup shape	vig.
Francois Levet . .. .. S P	Chinese rose, medium size	vig.
Francois Louvat ....S	deep crimson, shaded with lilac, very large and fine cupped form; a superb Rose	vig.
Francois Olin	cherry-red, mixed with white, large, full, well formed, blooming in clusters	vig.
Geant des Batailles	brilliant crimson, large, full, and very sweet; a well-known old Rose	mod.
Général Jacqueminot....S	brilliant scarlet-crimson, most superb glowing colour, and a most abundant bloomer; a fine bedding Rose	vig.
George Baker .... S	a pure lake, shaded with cerise, good form	free.
Georges Moreau....S	very bright, shaded red, very large, opening well; globulous	vig.
Gloire de Bourg La Reine ..	fine brilliant scarlet red, and crimson, flower large and full; a superb Rose	vig.
Gloire de Rosomene .... P	brilliant crimson, semi-double; most effective and beautiful as a Pillar Rose	free.
Glory of Chesham ....S P	this is a seedling from *Charles Lefebvre*, with flowers of a rich shaded crimson, very bright and vivid	free.
Guillaume Guillemot.... S	carmined rose, with pale reflex, very large full, and globulous; a seedling from *Madame Charles Wood*	vig.

(To be continued.)

THE SELECTION OF SEEDS.

There is probably no point on which a greater diversity of opinion exists amongst Gardeners than that of the proper selection of seeds for this climate. We do not refer so much to the particular varieties to be grown as to the source from whence to procure them,—many advocating the use of American or Cape seeds. These, however, in our opinion, have but one good quality, and that is, their superior germinating power; but this does not in any way make up for the inferiority of their produce, which is very rarely equal to that of carefully acclimatised seed. Others prefer German or French seeds, and certainly, if procured from a source that can be relied on, they would no doubt be all that can be desired, as

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most of the choicest varieties of flower seeds are grown exclusively on the Continent.

Experience has, however, proved that English seeds are more to be relied on, and are invariably of better quality than any others; that is, of course, provided they are procured from a reliable source, properly packed, and care taken that they are never opened or exposed to the air till the time required for sowing; failures will then be of very rare occurrence.

The improved means of communication with all parts of the world has now made it a simple thing for the amateur to import annually what he actually requires. Care should, however, be taken to arrange for seeds to arrive as near as possible to the time when they will be required for sowing; for, no matter how carefully packed, seeds in this country soon lose their vitality. The cheapest mode of transit for flower seeds, or the lighter varieties of vegetables, if procured from England, is of course by Overland Parcel Post, through which packages are delivered at the rate of eight annas per pound anywhere in India. For large parcels, or heavy seeds, such as peas, beans, &c., this route would be too expensive, but these can be shipped by canal steamers at moderate rates.

Many of the largest English seedsmen now make the export of seeds a prominent feature of their business, and spare no pains or expense to make their various systems of packing as successful as possible; and especially so for India, for which perhaps more care is required than for any other part of the globe.

In an article of this kind of course it is impossible to recommend any particular seedsman to order from. We certainly have our particular favorities, but probably our experience would not coincide with that of many others. For instance, last season, we procured a case of seeds containing upwards of 200 varieties, and in a trial sowing more than 90 per cent. germinated, and the main crop was in every way a success; and yet a friend, who purchased seeds from the same house on our recommendation, met with a complete failure, not more than six varieties out of 100 germinating at all. The two parcels were packed in precisely the same way and at the same time, and yet who shall say what was the cause of the failure. The seedsman is of course blamed, and probably unjustly so. It is much more likely to have been owing to their having been needlessly opened through idle curiosity and not properly closed again, or perhaps from having been sown too early —a mistake that is too often made in this country.

Above all things never be induced to order cheap seeds from unknown houses. These too frequently turn out a perfect failure, either from not being true to name, or perhaps from being more than one year old; and, although in most instances this would matter little to home consumers, in all probability, by the time they arrived in this country, they would have lost all their vitality.

In a limited space of course it is quite out of the question to give anything like a complete list of all the varieties of flowers or vegetables that can be grown successfully. The selection must be left to each individual taste. There are, however, a number of old favorites that must be mentioned, for without them no garden would be complete. In addition to growing old or well known plants, it should be the ambition of every owner of a garden to endeavour to introduce something new, or an improvement on old forms. If every one aimed at this, we should soon have our gardens as well stocked as our friends in Europe, and horticulture in India would be far more popular than it is at the present time. Take for instance the most simple, and yet one of the best known, plants in the world—"Mignonette." Who would grow the old familiar "Reseda odorata" after having once seen the two new varieties, "Crimson Giant" and "Miles's Spiral," the latter of which throws up spikes of flowers 8 to 10 inches high, and equally as sweet-scented as the old variety? Or another example. The new tuberous rooted Begonias. Here we have an entirely new race of plants, and one which bids fair to become even more popular than the Geranium or Fuchsia. For two seasons we imported both bulbs and seeds, but all invariably failed; the bulbs would never start into growth, and the seedlings damped off nearly as soon as they had germinated, and our experience exactly coincided with that of others who tried the experiment at the same time. Determined, however, to persevere, we the following season again imported bulbs and seeds, and under a different mode of treatment the result was a complete success—the bulbs having formed plants fourteen to twenty inches in height and flowering profusely within three months from the time they were planted, and the seedlings were even more successful. From a small packet of seed, we have now 47 fine plants, eight of which have already flowered, and one is far superior to the named bulbs—the male flowers of this being nearly five inches in diameter.

Who will not admit that a success of this kind more than compensates for the disappointment and failures of the first two seasons?

The following is a list of Annuals which succeed well under ordinary cultivation:—

Annuals.

Abronia umbellata
" arenaria
" fragraus
Ageratum mexicanum varieties
Alyssum maritianum
Antirrhinum (snapdragon)
Aster chinensis
" German varieties
" French varieties
Balsams
Bartonia aurea
Brachycome iberidifolia
" alba
Browallia elata alba
" cærulea
" grandiflora
Cacalia coccinea
" aurea
Calandrina discolor grandiflora
Calendula (marigolds)
Calliopsis of sorts
Callirhoe aigitata
Candytuft
Chrysanthemum (annual)
Clarkia elegans and varieties
Phlox Drummondi
Poppy, Double
" Pæony flowered
Portulaca
Ricinus of sorts
Clintonia pulchella.
Collinsia bicolor.
" " alba.
Convolvulus Major.
Delphinium
Dianthus chinensis.
" diadematus
Didiscus cœrulea.
Globe amaranth.
Godetia of sorts.
Iberia.
Indian Pinks.
Larkspur.
Linum grandiflorum and varieties.
Lobelia speciosa.
Lupinus of sorts.
Marigolds of sorts.
Mesembryanthum.
Mignonette.
Mimulus.
Nasturtiums, Climbing.
Nasturtiums, Tom Thumb Varieties.
Nemophilla of sorts.
Sweet Peas.
Perilla nankinensis
Rhodanthe manglesii
Salpiglossis
Tagetes pumila
Whitlavia grandiflora

Annuals to be sown in June or July.

Amaranthus atropurpureus
" bicolor
" Henderi
" melancholicus rubra
" Princess of Wales
" Salicifolius
Balsams, Camellia Flowered
" Rose Flowered
" Dwarf varieties
Celosia cristata pyramidalis
Cockscomb, President Thiers
" Glasgow Prize
Datura fastuosa
" gigantea
" Wrighti
Gomphrena globosa
Helianthus (Sunflower)
Hibiscus africanus
" gigantea
" coccinea
Ipomea rubro cœrulea and varieties.
Martynia fragrans.
Nicotiana atropurpurea.
glauca.
macrophylla.
Marigold of sorts.
Zinnia elegans.
" Darwini.
" Haageana.
" vittata.

Perennials that can be successfully cultivated as Annuals.

Antirrhinum
Carnation
Cineraria
Daisy
Heartsease
Hollyhock
Dianthus
Pansy
Petunia
Picotee
Primula
Sweet William
Verbena
Violets

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THE COLEUS.

With the exception of the Croton there is certainly no group of foliage plants that has been so vastly improved during the past few years as the Coleus. So vivid are the colours of the newest varieties that no other foliage plants can for a moment bear comparison. For some years past the cultivation of the Coleus, both as a greenhouse plant and also for bedding out, has been extremely popular in Europe. The consequence of this is, that we have been inundated with an immense number of new varieties, and there are now probably several hundred named sorts in cultivation. Many of these are so much alike that it is quite impossible to distinguish them from each other in many instances.

Although the Coleus grows freely enough in this country, it can never be cultivated to that state of perfection which has been attained in England. During the cold season, say from October to March, the plants certainly thrive vigorously, and display all the brilliancy of their colouring; but as soon as the hot season has fairly set in, the markings gradually disappear, and the majority of the varieties then have no more beauty to recommend them than an ordinary nettle, to which they are very closely allied. The plants will continue growing freely through the hot and rainy seasons, and on the approach of the cold weather again assume their distinctive variegation. Old plants, as a rule, however, become overgrown and shabby in appearance. It is therefore generally advisable to cut them down closely early in September, and raise a fresh stock from cuttings. These root freely, and in the course of two or three months form large plants. If good-shaped bushy plants are, however, required, they must not be allowed to grow at random, but each shoot or branch should be stopped as soon as it has made four perfect leaves. If this is persevered in, they will form splendid specimen plants in one season. We append a descriptive list of a few of the most brilliant of the many new varieties.

1. Sir G. Wolseley—Rich rosy crimson, centre and yellow margin, very showy and distinct.

2. Ada Sentance—Large deep carmine centre, blotched with dark purple, broad light green band, veined with yellow and crimson.

3. Henry Irving—The richest coloured variety yet raised.

4. J. L. Toole—Very novel in colour, a gem; improvement on *Pompadour*.

5. Resplendent—Almost black, handsomely marbled green, and scarlet crimson colours; good habit.

6. Ariel—A pretty and distinct variety, colours—crimson lake, maroon, deep green, and yellow.

7. Madame Chretien—Centre of leaf rich claret-crimson, blotched blackish maroon, with a broad margin of bright green.

8. H. A. Mann—Yellow, beautifully netted green; the best.

9. Marquis de Nadaillac—Distinctly marked crimson, green, lake, and cream; good habit.

10. La Tete D'or—Novel and distinct, centre of leaf black, followed by a green ground, partly netted blackish maroon, remaining part spotted yellow, edged blackish maroon, and distinctly serrated.

11. Elegans—Large and beautiful foliage, forming into a well-shaped plant.

12. Dolly Varden—Ground colour deep green thickly and distinctly spotted with brownish maroon, distinct.

13. Mr. G. Simpson—Centre of leaf rosy crimson, edged dark maroon, distinctly serrated, very beautiful.

14. Magnificus—Ground colour light green and of a deeper shade of green towards outside of leaves, finely and beautifully netted maroon and purple, distinctly serrated, attractive.

15. Gloire de Rougemont—Deep reddish crimson and maroon, edged green, distinct.

16. Madame Arthur Goulet—Clear yellow shaded green, the nearest approach to yellow that we have.

17. Duchesse de Mortemart—A distinct and beautiful variety, green ground blotched chocolate-maroon and yellow, attractive.

18. Matterhorn—Light greenish primrose ground, blotched dark maroon.

19. Mr. Bolus—A sport from *Pompadour*, centre of leaf deep rosy magenta, veined deeper, outer portion deep brownish maroon, at times marbled with same colour, distinct.

20. Jules Chretien—A combination of blotches varying in colour from crimson, maroon red, to a bright yellow tint, distinct.

21. Edith Sentance—Bright crimson, broad band of blackish purple, narrow green edge.

22. Mrs. K. Hugessen—Beautiful golden ground, netted and blotched dark maroon; useful.

23. Mrs. Baxter—Crimson, with darker veins, edge green beautifully serrated.

24. Conqueror—Beautiful colours and foliage, forming into a well-shaped plant.

The Coleus may also be readily raised from seed, and if a good strain is secured, is sure to produce new and distinct varieties, the only difficulty is to procure seed that will germinate, as it soon loses its vitality. It is advisable, when possible, to sow it as soon as it is harvested.

THE VEGETABLE GARDEN.

Lettuces.

Lettuces appear to have been in cultivation ever since the time of the ancient Greeks and Romans. They form, when properly grown, a remunerative crop, inasmuch as a large quantity of them may be grown in a little space, and being quickly off the ground they may be cultivated in many vacant places that could not be otherwise properly utilised, such as between rows of Celery, close under walls, between fruit bushes, &c. Lettuces are mostly placed on the table whole, or at least the leaves are not cut, but they are also used cut up in salads with other ingredients; and of late years it has been a custom even to boil Lettuces in the same manner as Cabbages. One of the greatest aids to good Lettuce culture is a deep, rich soil, and it is far easier to make it deep and rich enough in the first instance than to struggle on through a hot, dry season on a poor, hungry soil, harassed by the necessity for incessant watering to keep the plants from bolting. The first requisite in Lettuce culture is a well-manured, deeply-cultivated soil—all other things are, in a sense, subordinate to this—and the next is frequent sowing and planting.

Thin the plants out according to the size of the kinds grown; 8 in. apart will be sufficient for Tom Thumb Cabbage Lettuce, whilst the larger kinds of Cos and Cabbage will require 10 in. or 12 in. Sow in drills, as it gives facilities for frequently stirring the soil with the hoe. The thinnings, if desired, may be planted elsewhere; but if the season be hot and dry, those that have not been transplanted will probably be most satisfactory. When hot and dry weather sets in, mulch with rotten manure, if possible, between the rows, laying it nearly up to the plants. A very great thickness will not be necessary; 2 in. or 3 in. at the most will be sufficient. This mulching saves a deal of labour in watering in dry weather. In fact, without mulching, on some soils watering is worse than useless; it encourages, during the time the effect of the water remains, the production of fibres near the surface, and if the water be neglected, for even a short time, these fibres perish. Far better will it be on hot soils, if mulching cannot be resorted to, to deepen the soil in every possible way, keep the surface loose by constant hoeing, and discontinue watering altogether, unless a regular and constant supply can be given. But when plants are mulched, a watering once a week or so washes the soluble portions of the manure down to the roots, and pushes on the plants rapidly.

Blanching.—This process is probably the most vital point in Lettuce culture, for to have badly blanched Lettuces, no matter however fine they may be in other respects, they are wanting in crispness, flavour, and appearance. There are now so many kinds of Lettuces that naturally turn in and blanch themselves, that these are probably the most likely to give satisfaction to most people. Where, however, those kinds are grown that do not naturally turn in, tying must be resorted to. This operation should

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at all times be performed on dry days, for if tied up while the leaves are wet, losses from rot will be the result Tying should be done when the plants have nearly attained their full dimensions, and two ties to a plant are better than one if time can be spared for it. If, however, Lettuces be wanted before they have time to grow to their proper size, they must be tied up at least a week previous to use.

Varieties.—Varieties of Lettuce, like those of most other vegetables, are known under so many different names that it is almost impossible to ascertain the true name of any of them. Perhaps to answer all purposes there is no Lettuce to equal the Black-seeded Brown Cos, whose chief faults are its wanting tying in order to have it properly blanched, and its brown colour. If, however, it be well tied, the inner leaves may be had of a pure white with purple ribs. Among the varieties of Cos Lettuce we may mention Alexandra (white), which grows to a large size, and is crisp and finely flavoured. The Paris White and Green Cos are too well known to need much comment; for summer use, as every one knows, there are few to equal them, blanching themselves as they do in the most perfect manner, and thus obviating the tedious task of tying. Williams' Victoria, too, is a fine dwarf kind, and excellent for winter use. The best kind of Cabbage Lettuce is probably Hammersmith Hardy for winter, and All-the-Year-Round for summer: the old Neapolitan, however, still keeps in the front rank. Wheeler's Tom Thumb, Lee's Hardy Green, and White Dutch, are all good kinds. Commodore Nutt is a Cabbage Lettuce of the All-the-Year-Round type, but it proved to be still dwarfer than that variety. It is nearly all heart, does not run to seed so soon as some of the larger kinds, and is a great acquisition, owing to its taking up so little room in beds or rows. Sutton's Gem is another Cabbage Lettuce of a large size, and one which forms good hearts, which are crisp and well-flavoured. One market gardener, writing on the varieties of Lettuce, remarks that, after careful trials of many sorts of Cos, and Cabbage Lettuces for several years, it has been proved that most of the so-called new kinds of white Cos are, after all, but mere selections from the old Paris white Cos. The two best strains are Waite's Alexandra and Dimmick's Victoria, the first being exceedingly even, true, and slow to run to seed; the latter also inherits most of these qualities, and is specially to be commended for its great size and usefulness for exhibition. Of Cos Lettuces the largest and best are Acme, White Cos, a very fine hardy variety, and Sugarloaf, Brown Cos, a strain of the Black-seeded Bath Cos. Neither of these require tying, and they are without exception first-rate. Among Cabbage Lettuces, the best is Leyden White Dutch for the earliest. If sown with the White Cos, kinds it will be ready for cutting a fortnight before them; and with it also sow Victoria Cabbage Lettuce, a fine solid kind, but several days later, and one which stands well.—*S. in the Garden.*

FLORICULTURE IN INDIA.

THE FUCHSIA,—PART III.—(*continued from page* 20.)

I will now explain the different forms and shapes into which it may be desirable on the one hand to train the Fuchsia for ornamental purposes only; and on the other, useful, as well as ornamental.

To enable me to do this, the class or tribe may be divided into four sections, thus: 1. The deciduous bushy shrub; 2. The standard for pendulous flowers; 3. The pillar, cylindrical or flat trained for the weeping habited; 4. The herbaceous.

1. The deciduous bushy shrub, will include those that branch freely, of dwarf shoot jointed habit, and when trained and grown, become self-supporting or requiring the assistance of a central stake only. The majority of Fuchsias will come under this section. The forms most suitable to their habit of growth, are conical, pyramidal, spherical or semicircular. The species are very numerous. The flowers of all are more or less pendulous, but those with short filamentary stems of globular form in the flowers, with short tubes and expanded corollas, and become reflexed after opening, will at once denote those belonging to this section. I may mention the good old "globosa" variety (which is, however, cupped, not reflexed) and its progeny, from Sir Colin Campbell, to Champion of the World, amongst the double dark reflexed ones. Miss Lucy Finnis and the flirtish looking Kingsburyana amongst the white double corollas all show their short tube and the globular form in the unexpanded flower buds. Many of the singles also show their origin similarly. This description will, I trust, render the selection easy and unmistakeable.

2. The standard, for pendulous long-tubed corymb clustered species, which form and elongate in a downward direction, from the terminal of each branch of which the old corymbiflora is the standard type, and can be grown in no other form with anything like the effect produced from this, nor any of its progeny. In the extensive collection of plants of a private establishment, where I was a pupil for four years, there was a plant of this species, the stem of which was eight feet in height, and its thickness two inches in diameter or more; the head six to seven feet diameter. From the end of every shoot there was a bunch of flowers which continued to grow downwards; open and shed round after round of the tubular or trumpet shape flowers, from May until November, and the fully ripened pulpy seed pods, which followed, until the filaments or stems had attained the length of four feet more or less. The fruit of this species resembles the Jamun (Zyzigium Jambolanum) of this country in size, shape, and colour. The treatment best suited for it, to ensure its flowering, is that of starvation; it requires no annual re-potting, or pruning, beyond the removal of any dead twigs and flower stems. Its nature seems to be that of growing into a tree, whether propagated by cuttings or from seed; as it persistently grows upwards as a single-stemmed plant, to a considerable height, so long as pot room is afforded it, or is otherwise unchecked. The plan of culture to adopt is to allow it to grow to the height required, which it will speedily do in a very small pot of six or seven inch size; discontinue the potting and commence the starvation process, by giving very little water. It may now cease growing and show flower, which will of itself check the upward growth, and three side shoots will appear at the base of the flower stem, which will form the future head. These three shoots may in course of time flower, and six or nine shoots follow: if these show flower, so much the better; allow this to continue until the plant shows signs of exhaustion and sheds its leaves, which it will do sooner or later under this starvation process. The plant may now be put by to rest for three months. The alternative course of culture is, by stopping the shoots at the terminals, where the flowers should appear at lengths of twelve, fifteen or eighteen inches, (if the flowers do not appear) continue this until the head is fully formed. In other respects the treatment remains the same. After the plants have rested and are again brought forward, a small shift will suffice. Use poor soil or sandy loam only for potting.

The early growth of the next season will be strong: allow the plant again to exhaust itself until the flowers appear; continue thus until the plant has attained the size desired, after which the annual potting may be discontinued and a little weak manure water applied occasionally, when it is in full flower, not before. The trouble taken to grow this, and its counterpart C. virginata, a light flowered variety, will be amply repaid for many years. "Penduliflora" differs in producing axillary as well as terminal clusters of flowers, and is therefore an improvement. "Songflora," "Ethel," 'Fireworks" and others that flower more freely, and are less persistent in growth, the drooping "Annie" and the new one sent out last year, "Dr. Sankey", will also come under this section of training. One strong stake only will be required until the stem is stout enough to support the head. I am glad to see that the last named species is described as a persistent flowerer.

3. The pillar system of training may be considered as equivalent to the elongated cone, for which so many Fuchsias are adapted. I have seen Corallina nearly twenty feet high. For lofty structures, recesses, and verandas, they are very useful. Some of the weeping and pendulous varieties show very well in this style. The cylinder and flat training system is suitable for plants of a semi-trailing habit and elongated growth, requiring support, which may be trained against walls or round pillars and on trellis work of various descriptions, for covering unsightly objects. Verandas are often partially enclosed by chicks, and wooden trellis work wire netting. On any of these, Fuchsias of the description named may be trained with excellent effect, and a continu-

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ance of bloom from May until November, or later, may be secured, by planting or plunging the hardy winter blooming species. Long and somewhat narrow ordinary boxes may also be used. The plants may then be detached and placed under protection in the winter, or the protection of mats may be used to prevent from injury, snow, frost and hail, without moving them. A partition fence of galvanized wire netting is very suitable for this purpose. Training the main branches horizontally and allowing the short side shoots, that bloom so freely and droop so gracefully, to remain loose and pendant, is the best form to adopt, as the side shoots break into growth, and furnish the branches more evenly, and the pruning in spring is reduced to the short spur system. Any other form of training may however be adopted. The main branches should be kept, and tied, on one side of the trellis only. Wires strained horizontally make undoubtedly the simplest, cheapest, and best form of trainers either as a running partition fence, or against a wall for this purpose; unless the fence is also required as a barrier against animals, in which case the wire netting or upright bar fence is more effective.

4. We now come to a most important section, the "Herbaceous." It may perhaps be edifying to the tyro and others who have not studied the vegetable kingdom sufficiently to know the difference between herbaceous and other perennials. To give a brief explanation:—All plants that die down to the ground, and shoot up again, are, as a rule, styled herbaceous, to distinguish them from shrubs, &c. that may be deciduous or evergreen, that do not die down. In this instance, the term is used for those Fuchsias commonly called hardy, which when planted out in climates where they are cut down to the ground by frost, shoot up again in the spring. Or it may be that gardeners find it better in culture, to cut them down that they may shoot up again. This last is, however, more properly speaking, a system of pruning. The difference between this and other sections described, will, I trust, now be understood as intended. The whole of this section are autumnal, and winter flowering when under protection; or winter flowering only in a temperature of 55° to 65°. The old Fulgens and its progeny, rubra grandiflora and multiflora pumila, are more decidedly herbaceous in habit than most others, having fleshy roots similar to the salvia fulgens, and I have seen them treated in precisely the some way as bedding or border plants—sometimes planted together in clumps for contrast, in other instances alternated in rows, and planted in lines when the ribbon style was so much in vogue. They do well when planted out, and flower profusely, but the flowers being pendant in terminal branches, are hidden by the foliage to a great extent when looked down upon, and their beauty is lost to the eye. When grown as a specimen plant in a pot, it should be plunged and treated in all respects as a bedding plant until it comes into flower, when it may be taken up and placed in a vase, or other elevated position on a level with the eye, or nearly so, where the drooping bunches of flowers and its beauty will be displayed and seen to advantage. If a vase for plunging it is not available, and the plant has to be placed on a stage post, or inverted flower pot, let the plant in its pot be slipped into a larger pot, using moss between the two and over the top, so that the roots of the plant may be enveloped and kept moist, as well as at an even temperature such as the soil in which it was previously plunged afforded it. This is well worth consideration. If a few stakes are wanted to regulate the branches, let them be neatly tied and the stakes so placed that the foliage will hide them. In the hills, when frosty nights commence, the plant will require the shelter of a warm place, if under glass so much the better. It will then continue to flower far into the winter, probably until February. When the flowering is over, dry the plants off until its foliage falls, when it may be put into the resting quarters, where it may remain until the rains commence in June. In this way most of the late flowering and winter varieties may be treated—some as bushes or standards, others cut down when they are intended to be started as described. For this section but little training with stakes is necessary, and no topping will be required. Serratifolia and splendens are also fleshy rooted, similar to the above. These with Dominiana, Longiflora, Pendulæflora, and others that are winter flowering, require an intermediate house, which means, or is apropos, a sub-tropical climate, and are prepared about midsummer to be grown on. My impression is that they may be all grown here in the plains by starting them in the rains, growing them through the autumnal months, flowering them in winter, and resting them from March or April until June or July, with every prospect of success, and especially so as this routine corresponds precisely with that of their culture under glass in an intermediate warm house at home. Nor do I see why the whole of the late flowering (Autumnal) varieties may not be grown here also—Formosa and Dr. Sankey amongst them. I consider the Konkan cool enough for them after the rains are set in, and the Deccan above the ghauts more so. The principal point is to allow them the rest nature has provided by drought through the hot months before the rains set in. If watering all the year round is persisted in, and plants kept growing throughout the year, failure must ensue for want of natural rest.

Shading.—The Fuchsia cannot stand the glare and hot rays of the sun even in England during the summer months—under glass they become scorched and in the open air disfigured it is therefore necessary to use a thin shading material.

I do not recommend shading as a novelty, but urge it as an absolute necessity for plant culture in this country, and protection from the heavy rains during the monsoons. Without it plants must suffer injury, and more especially when in bloom.

Structures.—The utility and superiority of glass structure for plant culture is now established in the hill stations, and are becoming so in the plains of Northern India. And for propagating purposes bottom heat is necessary for three or four months.

Fermenting material is recommended as inexpensive, and when decayed the most useful and best manure for mixture with soils for potting purposes, the ammonia and other qualities being retained. By exposure in decomposition they are lost. Atmospheric heat is required in the hills to prevent damage by frost and snow where tender plants are cultivated. Canvas structures are very necessary during the hot season and the rains, they are also very useful for half-hardy plants during the winter, for protection from frost and snow, also hail in the spring, if covering material such as frigi-domo, manufactured for the purpose at home, is used. In the hills I have used sacking and gunny, such as old rice bags, mats, old durries, &c., which answer the purpose very well for Fuchsias and other plants at rest, if the pots are plunged in dry soil, enveloped in moss, when other accommodation is not available. Where the materials are obtainable at reasonable prices, very creditable and even ornamental structures may be made at a minimum cost by the use of one or three-quarter inch gas piping to form the skeleton frame-work; cover this with galvanized wire netting strained tightly. If the half-inch mesh is used, protection from hail will be thereby provided, and it may be utilized as an aviary and plant-house combined. If the gas piping is not available, sawn timber or straightened bamboos may be substituted. If the wire netting is too expensive, stout chicks may be substituted. Where there are walls of any kind, lean-to structures may be adopted, where there are none, span roof ones are the most convenient form.

Hot-beds.—Mention has been made of the necessity of bottom heat for starting the plants early in the season, striking cuttings and forwarding the growth of the young plants by a good start. After this, although useful, they are not absolutely necessary, and for late work may be dispensed with. The moist atmosphere and even temperature at night may, however, be a matter for consideration. The only expense attending it is labour, in getting the materials together and making the beds.

One-third horse droppings and stable sweepings, to two-thirds of fallen dry leaves, will make what is termed a sweet bed and ferment steadily, but if too much grass is used it will become very hot, throwing off excessive steam, and will last a much shorter time. Leaves on the contrary produce a mild heat and last a much longer time. Any dry leaves will do, but oak leaves are the best, maintaining heat double the time of any other kind, from their slow decomposing properties.

When the quantity required is collected, mix them together in the proportions mentioned, and moisten the whole, not at one operation, but by layers as the leaves and dung sweepings are being put together; turn the heap over two or three times, about every third day, adding as much water as may be required to moisten the whole moderately. When the fermentation is at its highest

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pitch and the whole has turned black, the bed may be made, or, as gardeners term it, put together. Small beds when made above ground are liable to changes of heat by high winds and drought, or a fall of snow, and sometimes lose their heat altogether; and besides exposure, are unsightly, awkward to get at for general work; the pit system is therefore the best. As a temporary arrangement, the pit may be a hole in the ground of the length and breadth required, and from two to three feet deep. For a box or wooden frame, blocks of wood, or temporary dry built-brick pillars, from three to three and a half feet high from the bottom are necessary at each corner to set the frame upon; it may thus be filled to the depth of 4 feet with the fermenting material, which will sink to 3 feet or level with the ground. Over this put three or four inches of fine soil for plunging the pots into, and keeping down steam. In excavating or digging the hole two feet in depth will raise the sides round about one foot, nothing more is necessary in making the bed. Observe to select a piece of ground above, not below, the general level, or it may be subject to inundation, whereby the bed would be spoiled. Where plants are grown to any extent, the most useful and necessary structure is a propagating house. On a small scale, frames or pits are its substitute. The most convenient width for these is five feet or six at most; if more than this, it would be inconvenient and beyond the reach of the arm, from the sides, for executing any necessary operations.

LONDON OFFICE

OF

THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

1, Whitefriars Street, London, E. C.

Correspondence.

TO THE EDITOR OF THE "INDIAN GARDENER."

DEAR SIR,—Can you or any of your readers kindly inform me if the YELLOW Eucharis Lily is obtainable in India, and if so, where? And if any process of cultivation or manipulation will convert the *white* into a *yellow* flowering plant? You are doubtless aware that the yellow Eucharis is much more esteemed in England, but here I can only find the common white, though the latter is more beautiful

BOMBAY.
12*th September*, 1885.

I am, Sir, yours truly,
M. H.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to, should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

ENGLISH PLANT NAMES.

In advocating the employment of English names for plants grown either of use or ornament by English-speaking people a word of explanation may be necessary. They are firstly and mainly intended for those who have neither time nor inclination to learn Latin names and their meanings. Botanists, nurserymen, and gardeners must perforce use Latin or Greek names, but altogether these form such a small class compared with the millions who must needs in some way think and express their thoughts about plants and flowers, that for the masses English names, as short and as sweet in sound and as definite as possible, are an absolute necessity. No one supposes that they can in any way supersede Latin names as used by botanists or by people who care to learn such Latin names. They are simply an aid of the most important kind to those who can never devote time to learning Latin names, and yet who wish to think and speak about common flowers in a common-sense way.

Native names, I may mention, have long been used by all nations, and even Britons found such names for food plants and trees useful long before Latin ones were known in this country. Native names, too, have always been used for native animals and minerals, and while fully recognising the utility of Latin and Greek names all over the scientific world, there yet remains the greater world unscientific, which will have no means of expressing its ideas anent many useful and beautiful things if it be debarred from using popular English names. The plain fact, however, is that such names are unconsciously in daily use by millions, and to try to stop the increasing tendency and desire to thus speak of things in our own tongue is futile in the extreme. The age of hard-word pedantry is being swept away by the era of common sense and real knowledge, and the plainer and more intelligible we can make the language of gardening and garden botany the better both for our art and for ourselves. The question is not whether Latin is preferable to English or English names to Latin ones, but rather as to whether English names are not useful adjuncts to the Latin ones. The question is not whether "Viola odorata" or "Sweet Violet" is the better name, but whether we are to be debarred from using the name "Sweet Violet" in speaking of the plant to an inquirer who has not the slightest idea of what is meant by Viola odorata. If an inquirer points to a Palm and asks us the name of it, we may say," Oh! that is Phœnix dactylifera." "Ah! yes," says our visitor, " but what is its English name?" Now comes the rub. Are we to say, " It is the 'Date Palm,' " or are we to simply reiterate what is perfectly unintelligible? "Well, all we can say is that its name is Phœnix dactylifera, and that its fruits are edible." We are quite sure that no one, however repugnant English names may be to his instinct and training, would object to the use of the above popular names. The chances are that every scientific botanist uses them by word of mouth in his lectures, and perchance puts them into his text books also. His argument is, "Oh! we don't mind using English names, provided they are genuine ones, but you have no right to coin English names for yourself or others." The only question as regards this point in our mind is as to whether the plant or other object has already a good and well-defined English name. If so, we are always glad to use it; if it has not, then, as the least of all evils, we have no hesitation in removing that difficulty for those who must speak of it by an English name, or not speak of it at all.

We were not the first, nor are we alone, in this desire to popularise our craft to have it "understanded of the people." We merely continue the work which Chaucer, Spenser, Shakespeare, Gerard, Parkinson, Milton, Bacon and others began in books, but the vernacular names themselves were in daily use centuries ere books or botanists were thought of as we now understand them. The following extracts from Lindley's "Vegetable Kingdom" (preface to edition 1853) will show how much attention he, as a botanist, gave to it. "Since the days of Linnæus, who was the great reformer of scientific nomenclature, a host of strange names, inharmonious, sesquipedalian, or barbarous, have found their way into botany, and by the stern, but almost indispensable, laws of priority are retained there. It is full time, indeed, that some stop should be put to this current of savage sounds when we find such words as Calucechinus, Oreoigenesa, Finaustrina, Kraschenninikovia, Gravenhorstia, Andrzejofskya. Mielichoferia, Monactineirma, Pleuroschismatypus, and hundreds of others like them, thrust into the records of botany without even an apology. If such intolerable words are to be used they should surely be reserved for plants as repulsive as themselves, and instead of libelling races so fair as flowers, or so noble as trees, they ought to be confined to slimes, mildews, blights, and toadstools. All should be anxious to do something towards

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lalevisting this grievous evil, which, at least, need not be permitted to eat into the healthy form of botany clothed in the English language. No one who has had experience in the progress of botany as a science can doubt that it has been more impeded in this country by the repulsive appearance of the names which it employs than by any other cause whatever, and that in fact this has proved an invincible obstacle to its becoming the serious occupation of those who are unacquainted with the learned languages, or who, being acquainted with them, are fastidious about euphony and Greek or Latin purity. So strongly have we become impressed with the truth of this view, that on several occasions we have endeavoured to substitute English names for the Latin or Greek compounds by which the genera of plants are distinguished. Upon turning over the later volumes of the 'Botanical Register,' many such instances will be found in imitation of the usual English names Hound's tongue, Loosestrife, Bugloss, Soapwort, or Harebell, &c.... If such English names are not universally adopted, it is to be suspected that the circumstance is traceable to the indifference of the public to partial and inconsiderable changes, which are unseen in the ocean of botanical nomenclature. That they are important must be admitted; that the person most careless as to the difficulties of articulation would prefer to speak of a Fringe Myrtle rather than of a Chamælaucium, or of a Gritberry than of Comaroста phylis, will probably be allowed on all hands; and therefore we do not confess discouragement or failure, but would rather invite suggestions as to the more probable means of success where translation is neither necessary nor desirable in all cases. Many Latin names have from custom been adopted into the English language, and no wisdom would be shown in attempting to alter such words as Dahlia, Crocus, Ixia, or even Orchis."

WORK IN SEASON.

The Vegetable Garden.

We can only speak in general terms of the work which may be advantageously done now, preparatory to the active season which approaches. The thoughtful reader will study out the subject for himself and leave nothing undone which may expedite the varied and important labours which must be taken in hand next month. It must be borne in mind that our directions for sowing seeds must be taken rather as reminders of what may perhaps be done with safety than as absolute rules. Each one must use his our judgment, it being evident that in our changeable climate seed which may be sown with comparative safety at a given period one season, it would be folly to sow at the same period another season. We must each for ourselves observe the temperature of the atmosphere and condition of the soil and act accordingly. Dig or trench all vacant ground; if the soil is sufficiently friable a heavy dressing of manure should be given on those portions on which we intend to plant our gross feeding crops, such as the Cabbage, Cauliflower or Celery. The advantage in applying manure some time before the ground is required, is that it has time to become thoroughly incorporated with the soil and is consequently then in a much better condition to afford strength and nourishment to the intended crops, than it is when newly applied.

The first sowings of the Cabbage tribe should now be ready for transplanting. This is best done as soon as plants have made their first perfect leaf. They should be pricked out into beds of light, rich soil, placing them about three inches apart, protecting them from excessive sunshine and also heavy rains. Celery should also now be ready for transplanting the first time, treating it the same as Cabbages. Second sowings of Cabbages, Brussel's Sprouts, Cauliflowers, Savoys and Knohl Khol should be made before the end of the month. As soon as the weather clears up, the first sowings of Turnips, Lettuces, Beet and Carrots should be made in raised beds. Sowing so early is of course attended with a considerable degree of uncertainty, as if heavy rains again ensue, the seed is inevitably lost, but still the experiment is worth the risk, as provided the weather continues fine, we shall by this means be almost a month in advance of our friends who are not so venturesome. Artichokes and Tomatoes should be sown in pans under shelter.

THE FLOWER GARDEN.

Sowing of Asters, Pansies, Cinerarias, Primulas, Verbenas, Dahlias and Balsams may be made, keeping them carefully protected from heavy rains; as soon, however, as they are above ground they should be exposed fully to the air whenever the weather is fine, otherwise they become weak and drawn and probably damp off.

Cuttings of Crotons, Panax and other foliage plants may still be made; old plants, however, should not be cut too severely now as they will not have sufficent time to make new growth before the cold season sets in, when they remain almost stationary.

Pot plants should be carefully looked over: perform whatever pruning may be required and re-pot all those that need shifting. They will then have time to get a firm hold on the new soil before the end of the rains, and will be better able to withstand the many vicissitudes attendant on artificial watering that pot plants have to encounter all through the cold and hot seasons.

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Lot 9.—9½ yards, Fancy Pink Sateen, As. 12, 5½ yards, Light Blue Zephyr, As. 6, 9 yards; Fancy Marone Lustre, As. 10, 2 yards, Claret Percale, As. 8, 6 yards, Brown and Buff Zephyr, As. 6, 3 yards, Claret Percale, As. 6. **Rs. 19.**

Lot 10.—5¼ yards, Light Figured Sateen, As. 12, 12 yards, Light Striped Zephyr, As. 3, 7½ yards, Fancy Striped Beige, As. 10, 4½ yards, Dark Fancy Cambric, As 6, 3½ yards, Small Check Tweed, As. 12, 6 yards, Navy and Cardinal Spot Cambric, As. 6. **Rs. 17-9-0**

Lot 11.—8 yards, Light Fancy Cambric, As. 8, 12 yards, Brown and White Check Zephyr, As 3, 3½ yards, Light Pink Print, As. 10, 9 yards Blue Figured Lustre, As. 10, 1½ yards, Prune Fancy Printed Cambric, As. 6, 2¾ yards, Cream Marcella, As. 8, 4¼ yards, Dark and Light Blue Diamond Pattern Cambric, As. 6. **Rs. 17-9-6.**

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Editorial Article.

DEEP CULTIVATION.

One of the most important operations in the Garden at this season is a thorough preparation of the soil previous to planting. It may not in all cases be possible either to give the beds a dressing of manure, or to take away the old soil and replace it with new, but all can make an effort to stir up the soil deeply. A good stirring up of the soil enables the plants to take care of themselves to a much greater extent as regards root moisture in hot dry weather, because the roots can penetrate deeper than they otherwise would do, and so suffer less from heat and drought. We fear that most of us are too apt to regard many plants as shallow rooters, when in fact they are not. The greater number of objects we cultivate (whether flowers or vegetables) would root deeper if the soil was liberally prepared to a good depth. Deep cultivation means not only an extension of roots, but an increase in their number, the result of which must tend to an increase in the size and vigour of the plant.

As to the subjects to which it is applicable there is hardly an exception, because, if a deeply stirred soil is not absolutely necessary for a few shallow-rooted plants, it is beneficial in many ways, as excess of moisture can run away quickly, and it also increases the warmth of the soil. Deep cultivation, it must be understood, may be rendered of little value if the work is not conducted on sound principles. The deep trenching of any particular piece of ground may do much good or harm according to the nature of the subsoil. Yet if ground is moved to a considerable depth, its fertility is increased if the work is done in a proper manner. By this we mean that the nature of the soil at one foot or more below the surface should alone decide how the work of deep cultivation is to proceed. If the good soil should extend to a depth of two feet, the ordinary way of bringing the bottom soil to the surface will suffice; but if the lower stratum is much inferior to the surface soil, it ought not to be brought to the top. This is a very important point, for crude soil will render the surface quite unfit for the reception of small seeds, or any choice crop, for two or three years to come.

These remarks are quite seasonable, as many of us will soon be engaged amongst our flower beds as well as planting other important crops, the future welfare of which will depend in a great measure on the proper preparation of the soil. To a certain extent the nature of the soil must determine the amount of preparation necessary, but whether the staple is rich or poor, it is benefited more or less by deep cultivation. We have always secured the best results when reasonable care has been bestowed on its preparation. A good deal may be done in a rough and ready way where manure is plentiful, but where it is not, more care is certainly necessary in preparing the soil. So great is our faith in deep-trenching and other attentions to the surface, so as to secure a

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good tilth, that we would rather dispense with a portion of the manure, if we could give due attention to the preparation of the soil by frequently stirring the surface, and by placing round the roots of newly-planted subjects a little fine soil. Most of us know what influence a rich deep soil has on the majority of crops, and the satisfactory results secured by somewhat hurrying planting operations. But in gardens where the supply of manure is limited, the soil naturally poor, and the preparation neglected, the results are most disappointing. The moral of this reasoning then (and it is borne out by practical experience and observation) is, that in gardens where the soil is poor and the supply of manure limited, more attention is required to deep digging, not that extra labour in preparing the soil is equal to a full supply of manure, but it will go a long way to make up for the deficiency.

Although we frequently hear doubts expressed as to the beneficial effects of frequent and deep cultivation—and some go so far as to quote instances of soil that has been injured and rendered less productive by it—we must, from our own experience, come to the conclusion that in all such cases the waste of labour was due to an utter disregard, and in defiance, of anything approaching scientific cultivation. It must be obvious to the most casual observer, that although the manual labour attending the act of trenching the ground does not require any great skill to direct it, yet its utility may be more than counteracted if done on a haphazard plan, without any regard to character of soil, the nature of subsoil, and whether freshly broken up or old, and what is sometimes termed "worn out" from repeated cropping. We have no hesitation in saying that the "worn-out" theory is entirely brought on by substituting shallow surface stirrings for good deep and thorough cultivation, and in some measure by lack of attention to the proper rotation of crops; for although land may be destitute of the elements necessary to perfect one crop, it may be rich in what another requires; and when the surface is cropped repeatedly with crops nearly allied to each other, it may only yield moderate results; whereas if fresh soil were brought to the surface by deep cultivation, the very elements that are wanting may be restored, and substances converted into food for future crops by atmospheric action that would never have been available if buried deeply, as the more solid the land becomes the more is the soil closed against the action of the air. Far land of this description trenching by merely substituting the bottom spit for the top is best, and fresh unrotted manure will be more beneficially worked in at the bottom of the trenches than thoroughly decayed materials. The earlier this is done in the season the better, as the lengthened exposure to the air will pulverise and sweeten any crude substances brought to the surface and furnish abundant food for bringing succulent crops to perfection at all seasons, as in exceptionally wet seasons the thorough drainage ensured renders the land warmer by admitting the air; and during periods of drought there is no remedy half so successful as a good depth of thoroughly pulverised and enriched soil where the roots can descend and find plenty of soluble food at all times. No amount of labour expended on watering and surface stirring will do more than mitigate the evil arising from shallow cultivation at such periods, for it is the lack of food that deprives vegetable crops of their succulence.

When we come to deal with freshly broken-up land, or where a bad subsoil exists, the manner in which the trenching is performed must be modified according to circumstances, but we never yet saw land that could not be made fit for first class garden produce by the addition of substances in which it was deficient. When the subsoil is exceptionally poor,—either clay or sand—but a small portion should be brought to the surface. With heavy land such substances as leaf mould, ashes or sandy dressings, will prove more beneficial than unctuous manures, which will be more profitably employed on lighter descriptions of soils; but it is better in such cases not to bury it so deeply, as when the subsoil is very porous the manurial properties are liable to be wasted by the superabundant drainage.

The land should in all cases be allowed a considerable period to elapse before cropping. Frequent surface stirring should be resorted to to keep it clear of weeds, and in such a condition as to receive the greatest advantage from solar heat and air.

Editorial Notes.

BEANS were used medicinally by the ancients. When bruised and boiled with garlic, they were said to cure coughs that were thought past remedy.

IN China a liquor is distilled from the flowers of the chrysanthemum which is regarded as an elixir vitæ, and in the Chinese pharmacopœia a powder of the flowers is prescribed as a cure for drunkenness.

IN the *Revue de l'Horticulture Belge*, M. Bouchetet describes a test for ascertaining the quality of a pear. If, says he, you can write on it easily with pen and ink, it is a good pear. Other pears, the rind of which does not take the ink so well, are inferior in flavour.

AMONG the curiosities of Brazil is the pottery-tree. The trunk does not exceed a foot in diameter, but it grows to the height of one hundred feet. The chief peculiarity, however, is in the nature of the wood and bark, which contain so much silica that they are used in the making of earthenware. The fresh bark cuts like soft sandstone.

COCOA-NUTS were highly esteemed by the Mogul emperors for goblets, for which purpose they were beautifully polished, fitted with gold rims, and adorned with precious stones. It was supposed that poison would lose its fatal properties when placed in such vessels.

THE secretion formed by certain plants like the nepenthe—a secretion capable of dissolving or digesting animal substances—is poured out from small glands in the sides of the flowers. These glands number as many as three thousand to a square inch. Some of these flowers, which are shaped like pitchers, and have a lid, measure eighteen inches long, being large enough in the bowl to trap a bird or mouse or other small animal; the smaller flowers content themselves with insects.

THE scarlet-runner (*Phaseolus multiflorus*) was brought into Europe from South America in 1633, and was first cultivated at Lambeth, by Tradescant; but it was merely planted as an ornament to cover walls and to form arbours, without any idea of cooking the pods for the table. Its flowers were in favour for nosegays,

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but its legumes did not come into use as an edible vegetable until brought into notice by Miller, in the eighteenth century.

A HANGING garden of sponge is one of the prettiest novelties. Take a white sponge of large size and sow it full of rice, hemp, canary, grass, and other seeds, then place it in a shallow dish, in which a little water is constantly kept, and as the sponge will absorb the moisture the seeds will begin to sprout before many days. When this has fairly taken place, by means of cords the sponge may be suspended in the window where a little sun will enter. It will thus become a mass of green foliage, and should be refreshed with water daily so as to be kept moist.

HORTICULTURAL ORNAMENTS.—"One of the prettiest objects I have ever beheld," writes a correspondent, "is a spruce cone filled with sand and grass-seed which sprouted and grew out of the scales. It is now as large as a cocoa-nut with the husk on, and of the most vivid green colour. The grass grows with a luxuriance that is remarkable. To produce this charming specimen, the cone was baked in a stove till the scales opened out equally. It was then carefully filled with equal parts of sand and grass-seed, a string tied to the top, and the whole suspended in the dark, in a jar, with water enough to come half-way over the cone. In a week it was placed in the sunlight, when the seed sprouted rapidly, and in a month filled a gallon jar completely. It has been taken out and hung in the window. Every morning it is thoroughly soaked in milk-warm water

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ASPHALT WALKS.—Take two parts of very dry lime rubbish and one part coal ashes, also very dry, and both sifted fine. In a dry place, on a dry day, mix them, and leave a hole in the middle of the heap, as bricklayers do when making mortar. Into this pour boiling hot coal tar; mix, and when as stiff as mortar put it down 3 inches thick to form the walk. The ground should be dry and beaten smooth. Sprinkle over it coarse sand; when cold pass a light roller over it, and in a few days the walk will be solid and waterproof. An old path will only require to be swept clean; a new made one to be well beaten and rolled. Choose a warm day, the warmer the better; let the tar be boiling hot; use the common, long-handled, iron-bound tar brush, and iron kettle holding about a gallon, for the purpose of taking only so much tar from the boiler at one time as can be used in about a quarter of an hour, and paint over with a good coat. Let a lad follow with dry sifted sand, throwing over enough to prevent the tar sticking to his feet, and then go over with the roller. Two men tarring will employ a lad to follow with the sand, and another to attend the fire and supply the tar as fast as used. This repeated every three years the surface will become quite hard, and the paths will always be perfectly dry and pleasant to walk upon even in the worst of weather. The walks are made soft by the sun if the tar has not been made quite hot when used.

THE FIRST FUCHSIA.—The fuchsia, which is now in every garden, fifty years ago was exceedingly rare and highly valued; and the story of this beautiful shrub's introduction into our gardens is interesting. Some time in the first quarter of the present century a gentleman from Liverpool, while walking through a street in Wapping, saw in the window of a humble-looking tenement a graceful little shrub, with dark green leaves and beautifully pendulous carnation blossoms. He was charmed with the new floral gem, and when he returned to Liverpool called upon a celebrated florist, to whom he described the plant. The curiosity of the florist, who did not know any plant which came up to the description, was so greatly excited that he set off immediately for London. Having found the house, by seeing the plant in the window, he entered, and ascertained that its owner was the wife of a sailor, and that her husband had brought the plant home from the West Indies as a love-offering to his young spouse. The delighted florist made overtures for the purchase of the fuchsia, which were at first strenuously refused. After some little time, however, he got possession of the much-coveted prize. Having given the sailor's wife a handsome sum of money in hand, and a promise that the first plant raised from it should be sent to her, he started for Liverpool, and, after proper treatment, he soon had the plant exhibited in his show-room, where it instantly attracted the attention of amateurs. After fulfilling his promise to the sailor's wife at Wapping, he realised some £300 the first year the plant was exhibited, and was thus well repaid for his enterprise.

PLANTING OUT POT-BOUND PLANTS.—Whenever it is necessary to plant out anything that has become pot-bound, and it is not thought desirable to interfere with the ball, first make sure that the ball is thoroughly moist, and when planted, make the soil round it as firm as possible, leaving a slight cavity or basin when all is finished, to concentrate the moisture over the ball. When plants are planted from pots with hard balls in freshly turned-up soil, the water drains away too rapidly, and the plants perish from lack of moisture, even though plenty may have been poured round them. And this is one of the greatest objections which we have to planting out pot-bound plants of any kind without disentangling their roots. The work and difficulty of keeping plants put out under such circumstances supplied with water in a dry soil are increased immensely, whereas if the roots be properly opened out in planting, and laid in fresh moist soil, one or two good waterings will be all that is necessary; if dry weather follow, mulch thinly or thickly, according to the size of the plants and the nature of the soil. We are not now thinking or speaking of plants that are constantly grown in pots, and have occasionally, as they increase in size, to be shifted into larger pots. The two cases are not identical, for whilst there may be instances in which it may be desirable to reduce and open out the roots a little when subjected to fresh potting, in the majority of instances with plants in vigorous growth, the less the ball is broken up the better; but then in growing plants in pots it is easy to make the thin stratum of new soil between the ball and the sides of the pot firm, so that instead of draining off the water from the roots, it in reality holds plenty of moisture in suspension, which gives the desired encouragement to the growth of the plant.

MANAGEMENT OF ROSES.—The following good practical directions for the care of Roses, more particularly the hybrid perpetuals were given by J. H. Bourn, in his address before the Massachusetts' Horticultural Society:—

The ground for Roses should be thoroughly drained, rendered as porous as possible, and fertilized. In clay soils the use of sand, lime, soot, burnt earth, and loose, light vegetable matter, such as leaf mould, will alter the texture and improve the quality. At the time of planting, strong fertilizers are not required, and should not be given until the bushes have become established; they then like rich soil, which should be made light for the delicate rooting kinds, and more tenacious for the robust and hardy, and it would be reasonable that the classes and varieties differing in their nature should have more than one soil, if all are to receive that which is the most suitable. A renewal of the surface soil with old pasture loam every two or three years will supply important elements unattainable by any other method. We should avoid the application of more fertilizers in a soluble state than the plants can consume. It is well that the earth should be filled with stimulants in different stages of decomposition, that the plant may in all conditions of growth have plenty of food. When the plant is growing, and especially when flowering, weak liquid manure may be applied. Bone and potash act favourably early in the spring. A frequent sprinkling of water adds health to the foliage, and prevents injury by insects. The earth should be wet only when dry, and then thoroughly.—*Scientific American.*

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Original Articles.

THE ROSE.

Hybrid Perpetual Roses.—(*Continued.*)

Name.	Description.	Habit of Growth.
Harrison Weir ....S	beautiful rich velvety crimson, enlivened with scarlet, flowers large, full, very smooth	rob.
Helene Paul ....S	very fine white, sometimes shaded with rose, very large, of globular form	vig.
Henrich Schultheis	delicate pinkish rose; sweet scented; very vigorous; flowers exceedingly large, of first-rate form, and very full	vig.
Henry Pages	bright rose, large and full, fine form, good habit	vig.
Henriette Petit ....P	fine deep amaranth-red, large, full, well formed; in the way of *Beauty of Waltham*, but more vigorous	vig.
Henry Bennett ....P	intense violet-crimson, colour very rich, flowers cupped, good even petals, but not sufficiently full	vig.
Hippolyte Flandrin ....S	rosy pink, colour glossy and good, petals large, smooth, and firm, flowers very large, imbricated	mod.
Hippolyte Jamain ....S	fine bright rose, shaded with carmine, very large and full, flowers very even and well formed; a fine Rose	vig.
Horace Vernet ....S	rich brilliant velvety crimson, petals large and smooth, flowers large, full, and of a most perfectly imbricated form; a truly superb Rose	free.
Hortense Mignard	soft rose, a well-formed smooth flower, petals shell-shaped; a good flower	free.
Jean Cherpin ....S	rich violet-plum, a superb colour, petals smooth and well formed, and the flowers cupped	mod.
Jean Liabaud ....S	fiery crimson, centre rich velvety crimson, flowers large, double, and well-formed; one of the finest dark Roses	vig.
Jean Soupert ....S	plum-purple, almost black, flowers good size and evenly formed	vig.
Jeanne Sury ....S	bright claret and crimson, a large handsome Rose	free.
John Hopper ....S	centre brilliant rosy crimson, the outer petals lilac-rose, flowers cupped, full, and well formed; a first-class Rose	rob.
John Stuart Mill ....S	bright clear red, large, full, and beautiful form, fine shell-like petals of good substance; a good Rose	vig.
Joseph Metral	deep grenate-red, large, full; a new colour	vig.
Jules Chretien ....S	bright crimson-red, shaded with purple, very large, full, and well formed; a superb Rose	vig.
Jules Margottin ....S	brilliant glossy pink, a glowing flesh colour, flowers large; a beautiful old variety	vig.
Julius Finger ....S	pure white, lightly tinted with rose at the end of the season, large, full, and perfect form	vig.
Julia Touvais ....S	soft pink, with silvery rose tint, large, full, and distinct	rob.
King's Acre ....S	bright vermilion rose, flowers of extra large size, globular; a fine Rose for forcing	vig.
La Duchesse de Morny ....S	bright pleasing rose, flowers large, full, and beautifully formed, having petals of good substance	vig.
Lady Sheffield ....S	brilliant rosy cerise	
La France ....S	satin pink, outer petals pale flesh, flowers large and globular, partakes somewhat of the China Rose, very fragrant, distinct, and beautiful.	free.
La Reine ....S P	brilliant glossy rose, large and full	free.
La Rosière ....S	amaranth, large and full somewhat resembling *Prince Camille de Rohan*; a superb Rose	vig.
La Ville de St. Denis ....S	rosy carmine, flowers as large as those of *La Reine*, and exquisitely formed	free.
Lælia ....S	satin-rose; a noble Rose, with fine large smooth petals, and of exquisite form.	mod.
La Souveraine ....P	beautiful lively rose-carmine, reverse of petals whitish, very large, habit very robust, and very sweet; similar to *Madame Clemence Joigneaux*	vig.
L'Esperance ....S	rosy cerise, colour clear and satiny, flowers large, well formed and double, highly scented	mod.
Le Havre ....S	brilliant vermilion, flowers smooth and well formed; a fine Rose	mod.
Leopold I., Roi des Belges S	crimson, with a soft tint of violet, flowers large, full, and imbricated; a beautiful Rose	vig.
Lecocq-Dumesnil	dazzling red, strongly marbled and tinted with brown, crimson and violet flowers extra large, full, and perfectly imbricated.	vig.
Leon Say	bright red shaded with brown, lilac-rose, large, full; a good variety for bedding	vig.
Lord Bacon	flowers deep crimson, illumined with scarlet and shaded with velvety black, large and full	rob.
Lord Beaconsfield	blackish crimson, very fine large globular flower of good habit	vig.
Lord Frederic Cavendish	bright dazzling scarlet, being much brighter than *Duke of Edinburgh* or *Duke of Teck*; form unique, globular, and finely finished;	vig.
Lord Macaulay ....S	rich dark velvety crimson, colour dense and glowing, flowers large, double, and well formed; a superb Rose	free.
Lord Raglan ....P	deep crimson, changing to mottled crimson, large and superb	vig.
Louis Doré ....S	fine cherry-red, shaded with purple, fine form, large, full, a free bloomer, and a fine Rose	vig.
Louis Van Houtte ....S	deep red-amranth, shaded with dark claret, good and distinct, flowers cupped and well formed; a fine distinct Rose, and very fragant; superb	mod.
Lydia Martey	pale pink, flowers large, and of good substance	vig.
Mabel Morrison	a sport of *Baroness Rothschild*, pure white; not sufficiently double	mod.
Ma Surprise	bright scarlet, sometimes violet, not always perpetual; a seedling from *Eugene Appert*.	vig.
Madame Alexandre Julien	fine delicate fresh rose, large and full, beautiful elongated bud.	vig.
Madame Appoline Foulon	fine light salmon, shaded with lilac, flowers large and full.	vig.
Madame Alfred Leveau ....S	bright carmine rose, large, full, fine form	vig.
Madame Auguste Perrin	fine rose, reverse of the petals whitish, of medium size, large, well formed	vig.
Madame Bertha Mackart	deep rose, reverse of petals silvery, flowers extra large, cup-shaped, and somewhat globular; described as thoroughly perpetual.	vig.
Madame Boutin ....S	cerise, a beautiful clear colour, flowers very large and full, petals broad and even	rob.
Madame Caillat ....S	clear brilliant rose, flowers large and full, petals broad and even; a first-rate Rose, and quite distinct	rob.
Madame Charles Crapelet ....S	rosy scarlet, large smooth petals, flowers beautifully formed; a superb Rose	free
Madame Charles Wood ....S	beautiful clear rosy crimson, petals large and of good substance, flowers very large, expanded, full, and well formed	mod.
Madame Chevrot ....S	satin-rose, cheerful colour, smooth, well-formed flowers; seedling from *Victor Verdier*	vig.
Madame Clemence Joigneaux S	brilliant rosy carmine, flowers very large, deep, and very full, fine stout petals; a superb Rose	rob.
Madame Crosy	China rose, very large petals; seedling from *Souvenir de la Reine d'Angleterre*	
Madame Dorlia	bright cherry-red, shaded with purple, very large, full, and expanded	vig.
Madame Ducher ....S	bright carmine, very large, flowers evenly and well formed; a superb Rose	
Madame Eugène Chambeyran	light rose, shaded with copper, large, full, globulous, very fine form; a seedling from *Victor Verdier*	vig.
Madame Eugène Verdier ....S	light silvery rose, clear and good, of large fine-petalled globular shape	vig.
Madame F. Bruel	carmine-rose, large, full; seedling from *Comtesse d'Oxford*	

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Name.	Description.	Habit of Growth.
Madame Ferdinand Jamain	S rosy claret, deep petals, large and bold flowers, distinct and good; very fragrant	vig.
Madame Fillion	S fresh rosy pink, flowers large, full, and of good form; very fragrant	vig.
Madame Francois Pettit	P beautiful white, form globular	vig.
Madame Furtado	S brilliant carmine-rose, colour fresh and beautiful, flowers globular, of great depth and fine outline; highly scented, delicate habit	mod.
Madame Gabriel Luizet	S fine satin-rose, a very delicate and beautiful tint, large, full, and well-formed; a distinct and very beautiful Rose, very sweet	vig.
Madame Georges Schwartz	S glossy rose, with soft lavender shade, flowers large, full, and cupped; a fine deep flower and a superb Rose	vig.
Madame Hippolyte Jamain	S white, slightly tinged with rose, extra large, and a very fine show flower	vig.
Madame Jacquier	S lavender-rose, veined, and shaded bright rose, flowers globular, petals deep and shell-shaped; a handsome Rose	vig.
Madame John Twombly	deep currant-red, large, full, well formed, in the way of *Alfred Colomb*	vig.
Madame Jules Grevy	interior salmon-white, outside salmon-red, medium size; a sport between *Triomphe de l Exposition* and *Madame Falcot*	vig.
Madame Julie Daran	S violet crimson, flowers cupped, beautiful form, large smooth petals, of good quality	vig.
Mdlle. Julie Gaulain	fine rose, shaded with salmoned-orange, large, almost full	vig.
Madame Knorr	deep brilliant rose, outer petals whitish, distinct; very beautiful in bud	free
Madame La Baronne de Rothschild	S palest flesh, petals large and smooth, flowers large, double, and of fine globular form, very distinct and beautiful; one of the best	mod.
Madame La Marquise d'Herve	YS violet-red, shaded with bluish slate, large and full; this is the nearest approach to a blue Rose	vig.
Madame Lacharme	S white, centre the palest blush, cupped, exquisitely formed and highly scented; a beautiful white Rose	free.
Madame Laurent	S bright rose, fine large globular flower, handsome and distinct	vig.
Madame le Lievre de la place	bright shaded currant red, and whitish edge, flowers very large, full, and well formed	vig.
Madame Louise Vigneron	beautiful bright rose, with darker centre, flowers large, full, and well formed	vig.
Mdlle. Louise Annier	bright rose, large, full, imbricated form	vig.
Mdlle. Louise Chretien	deep rose, salmon in the centre, globulous, very large and full	vig.
Madame Louise Donadine	flesh colour in the centre, lighter on reverse of petals; a sport from *Countess of Oxford*	free
Madame Marie Bianchy	lilac colour, brighter in the centre, large, full, imbricated form	vig.
Madame Marie Finger	S flesh, centre deep salmon-pink, well formed; a fine distinct Rose, very free blooming	vig.
Madame Marie Ruderer	S bright cherry-rose, shaded carmine, large, full; a seedling from *Jules Margottin*	vig.
Madame Martha d'Halloy	cherry-carmined red, large, full, well formed; a seedling from *Madame Boutin*	vig.
Madame Marie Lagrange	brilliant carmine, large, or very large, almost full	vig
Madame Melanie Vigneron	beautiful lilac-rose, edge of petals silvery, flowers large, very full	vig.
Madame Montet	S very soft rose, large, almost full; very fine	vig.
Madame Nachury	SP fine satin-like rose, with a soft lavender shade, a new colour; flowers large, full, and cupped, distinct and well formed	free.
Madame Noman	S pure white, with peach centre, exquisite form; one of the best light Roses	mod.
Madame Olympe Tersetchenko	rosy white, or carmined rose, large, full, well formed	vig
Madame Oswald de Kerchove	white, rosy with coppered yellow at the base of the petals, of medium size, full, with imbricated form	vig.

Name.	Description.	Habit of Growth.
Madame Pierre Margery	S very fresh rose, lighter in the centre, large, full	vig.
Madame Prosper Laugier	rich clear rose, flowers extra large size, somewhat expanded, petals even and well formed	vig.
Madame Rochet	fresh satin-rose, large, full and globular	vig.
Madame Sophie Fropot	S pale satin-rose, broad, smooth, even petals, flowers cupped; a beautiful and distinct Rose	free.
Madame Thérèse Levet	S bright cerise, large and full, and beautifully formed; a distinct and very beautiful Rose	vig.
Madame Thevenot	bright lively red, flowers very large, full, and globular; very sweet	vig.
Madame Veuve Alexandre Pommery	pink rose shaded with bright rose, very large, full	vig.
Madame Victor Verdier	S brilliant rosy crimson, colour very beautiful, flowers large and well formed; a distinct and beautiful Rose	vig.
Madame Vidot	S palest flesh, most beautifully formed; a most perfect Rose	mod.
Mdlle. Bonnaire	S pure white, centre beautifully shaded with clear flesh, flowers of medium size and well formed; a very beautiful free-blooming Rose	mod.
Mdlle. Catherine Soupert	S white bordered and shaded with rose, large, full, of perfect form; a fine Rose	vig.
Mdlle. Emilie Fontaine	bright crimson-red, shaded with fire, large, very full, and well formed	vig.
Mdlle. Eugénie Verdier	S centre clear satin-pink, outer petal pale satin, colour clear and beautiful, flowers large, full, and cupped; a superb Rose	vig.
Mdlle. Ilona d'Adorjan	pale salmon-rose, reverse of petals silvery, very large, full, and excellently formed; a full distinct Rose	vig.
Mdlle. Julia Dymonier	S pink, changing to blush, flowers compact, beautifully and evenly formed, large and full; an improved *Marie Cointet*	
Mdlle. Louise Margerand	light rosy pink, with lilac reflex; somewhat resembling *Mrs. Rivers*	vig.
Mdlle. Marie Cointet	S bright satin-pink, outer petals paler, glossy thick petal; a very beautiful and distinct Rose	dwf.
Mdlle. Marie Closon	delicate rose, whitish edge, very full and well formed, very fragrant and free blooming;	vig.
Mdlle. Marie Digat	fine crimson red, large and globulous, free bloomer;	vig.
Mdlle. Marie Rady	S brilliant red, flowers large, very full, and beautifully imbricated; one of the most perfect	vig.
Mdlle. Marie Verdier	S bright rose, good cupped form; a beautiful Rose	vig.
Mdlle. Marguerite D'Ombrain	S satin-rose, flowers large, full, and globular; a distinct and fine Rose, very fragrant	vig.
Mdlle. Marguerite Manain.	S deep carmine-rose, beautiful fresh colour, very large and full; a fine Rose	
Magna Charta	S flowers bright pink, suffused with carmine, very large and full, and of good form	vig.
Marchioness of Exeter	S bright rose, flushed with carmine, a large, cup-shaped, and well-built flower; good habit and distinct	vig.
Maréchal Vaillant	S rosy crimson, colour bright, flowers large, double, and well formed; a fine Rose	vig.
Marguerite Brassac	S dark velvety crimson, similar to *Charles Lefebvre*, very smooth and even in form	vig.
Marguerite de St. Amand	S glossy satin-rose, a beautiful flesh colour, flowers extra large, globular, and well formed; a good distinct Rose	free.
Marie Baumann	S rich carmine-crimson, flowers large and of exquisite colour, perfectly formed; one of the best Roses	free.
Marie Louise Pernet	S deep rosy red, a fine large globular flower and well formed; a very good and distinct Rose	mod.
Mary Pochin	Lake, shaded with rich velvety crimson, colour very bright, flowers moderate size	
Marquise Adèle de Murinais	S flesh, large, compact full flower; a very beautiful Rose, and very sweet scented	mod.

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Name.	Description.	Habit of Growth.
Marquise de Castellane.....S	deep cerise, colour clear and good, flowers large, circular, and perfect; one of the finest	rob.
Marquise de Gibot	pale rose, flowers large, full, and globular ; a fine and distinct Rose.....	vig.
Marquise de Mortemart ...S	blush-white, centre pale flesh ; beautiful, rather delicate	dwf.
Masterpiece .....S	bright rosy crimson ; the flowers are very large, full, and of perfect globular shape ; habit good, and foliage fine	vig.
Maurice Bernardin.....S	rich crimson, shaded with violet, colour superb, flowers very large and double; splendid Rose	free.
May Quennell .....S	brilliant magenta-carmine, shaded with crimson, very large and full, and of perfect globular form	vig.
Marville de Lyon	fine pure exquisite white, slighty rosy, finely cupped and opening freely, flowers large, four to five inches in diameter, one of the best new Roses	
Miss Hassard.....S	beautiful delicate flesh colour, large, full, and fine form, very sweet, free autumnal bloomer	vig.
Monsieur Alfred Dumesnil S	deep rose, bright centre, flowers globular, large, and well formed ; distinct and very sweet	
Monsieur Boncenne.....SP	intensely rich plum, superb, flowers well formed ; one of the best dark Roses...	vig.
Monsieur. Benoit Comte	brilliant scarlet-red, shaded with vermilion inside, large, full, globulous and cupped.....	vig.
Monsieur Etienne Level ...S	vermilion, with a soft velvety lavender shade, flowers very large and full, petals exquisitely smooth and shell-shape ; superb	vig.
Monsieur Eugène Delaire...	velvety, lighted with fire-red, large, full ; extra.....	vig.
Monsieur E. Y. Teas ..... S	deep red, large, full, and of the most perfect form ; one of the best Roses grown, and very fragrant.....	mod.
Monsieur Fillion .....S	fine rose, striking colour, a large, full, and well-formed flower.....	vig.
Monsieur François Michelon S	fine deep rose, reverse of petals silvery white ; large and full ; very beautiful...	vig.
Monsr. Francisque Rive.....	bright cherry-red, very large and full, well formed	vig.
Monsieur Gabriel Tournier S	rosy crimson, flowers extra large, fine large petals, globular flower ; a distinct and good Rose	vig.
Monsieur Jules Monges	beautiful carmined rose, very large, full, cup shaped.....	vig.
Monsieur Noman .....S	delicate rosy pink, flowers large, deep, and of fine globular form ; a superb Rose	mod.
Monsieur Paul Néron..... S	pale soft rose, violet shade, flowers immensely large and full...	rob.
Monsieur Pierre Seletski ...	rich violet and crimson, petals even, smooth, and good ; a fine cup-shaped flower ; distinct, and very good ; handsome foliage.....	free.
Monsieur Thouvenel .....S	velvety red, large and full	vig.
Mrs. Baker ....S	beautiful shaded crimson, large, full, and well formed ; very beautiful.....	free.
Mrs. George Dickson	bright satiny-pink, flowers large, not too full, opening freely. First Class Certificate, Royal Horticultural Society	vig.
Mrs. Harry Turner.....S	colour intense crimson-scarlet, with rich maroon shading, flowers large and beautifully imbricated, the foliage dark and handsome ; somewhat resembling *Charles Lefebvre*	
Mrs. Jowitt	brilliant glowing crimson, shaded with lake, flowers very large, globular, fragrant.....	
Mrs. Laxton .....S	bright rosy crimson, large and perfect, as perfect as a Ranunculus ; a first-class Rose	vig.
Mrs. Rivers	pale flesh, nearly white, petals beautifully formed, cupped, large and full ; good habit	free
Nardy Frères .....S	rose, shaded soft lavender ; flowers very large, full, and well formed ; a very distinct and first-rate Rose.....	vig.
Oxonion.....S	shaded rose, large and full, fine globular form ; a good exhibition Rose	free.
Paul Verdier .....S P	rich rosy crimson, flowers large, double, and of fine imbricated form ; a fine pillar or wall Rose	vig.
Peach Blossom .....S	delicate peach, a new and beautiful color, large, full, and fine shape.....	vig.
Penelope Mayo .....S	brilliant carmine-red ; fine, distinct, similar to *Duchesse de Caylus* ; perfect form.....	vig.
Pierre Carot .....S	deep red changing to clear red, of medium size, large, perfect form.....	vig.
Pierre Durand	fine bright rose large, almost full	vig.
Pierre Notting .....S	deep velvety shaded crimson, globular, beautifully formed flower ; fine and distinct	vig.
President Senelar.....	deep cherry-red, changing to purple, very large and full	vig.
President Willermos .....S	rich brilliant carmine, with a very soft and pleasing violet tint ; flowers of moderate size, double, and well formed.....	free.
Pride of Waltham .....S	delicate flesh colour	
Prince Arthur .....S	very rich crimson shaded deeper colour; a dark form of *General Jacqueminot* ; distinct and good	vig.
Prince Camille de Rohan S	rich dark maroon-crimson, flowers moderate size, double ; one of the finest dark Roses	free
Princess Beatrice .....S	foliage large, bright and handsome, flowers deep pink, with clear blush margin, large, full, and globular form	vig.
Princess Louise Victoria...P	flesh changing to blush, moderate size, compact, very pretty and clustering ; a good pillar Rose.....	vig.
Princess Mary of Cambridge S	pale silvery pink, flowers large, full, and high in the centre ; a beautiful and desirable Rose	free
Princess Antoinette Strozzio	fine deep rose, flowers large, very effective and finely formed ; a flower similar to *Marie Rady*.....	vig.
Princess Charlotte de la Tremouille..... .....S	fine satin-rose, very large and full, globular form. free bloomer ; in the way of *La France*.....	mod.
Princess Radziwill	bright carmine, large, full and imbricated ;	vig.
Professeur Edouard Regel ...	red-cerise shaded silvery, flowers large, well formed, and in the way of *Annie Wood*	vig.
Prosper Laugier	brilliant reddish-scarlet, flowers large, double, and of splendid form	vig.
Queen of Queens.	flowers pink, with blush edges, large and full, of perfect form, and a continuous bloomer	
Queen of Waltham .....S	beautiful rose-cherry, a very distinct and lovely colour ; large, full, and double	free.
Queen Victoria .....S	flesh, shaded with pink, very large, full, and beautiful	mod.
R. C. Sutton	deep rose, the reverse of petals white ; a fine form ; very free blooming ; foliage exquisite ; one of the most sweetly-scented Roses.	
Red Dragon .....P	a hybrid climbing Rose, colour brilliant crimson, very bright and striking.....	vig.
Red Gauntlet	bright scarlety crimson	
Reine Blanche .....S	pearly white, centre palish flesh, flowers large, full, and cupped.....	vig.
Reine du Midi ..... S	fine satin-pink, flowers large, and of a fine globular form ; a fine Rose.....	vig.
Reynolds Hole .....S	maroon, shaded with crimson, flowers of good size, perfectly formed ; a fine Rose of new and distinct colour.....	free
Richard Laxton ..... S	colour reddish crimson, large, full, and cupped ; beautiful shell-like petal, and a fine Rose	vig.
Robert Marnock.....P	rich brownish crimson flowers, large, imbricated, and well formed	mod.
Rosieriste Jacobs .....S	fine velvety red, shaded with black, large, full, well formed, globulous ; extra fine	vig.
Rosy Morn	delicate peach colour, richly shaded with salmon-rose, large and full	mod.
Royal Standard .....S	beautiful soft satiny rose, large, very full, and exquisitely formed	vig.
Senateur Vaisse .....S	intense glowing scarlet, fine thick petals, flowers perfectly full, large, exquisitely formed, and highly fragrant ; a superb Rose.....	free

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Name.	Description.	Habit of Growth.
Sir Garnet Wolseley .....S	rich vermilion, shaded with bright carmine, and the colour well maintained throughout, flowers very large, full, and perfectly formed. This Rose is distinct from *Exposition de Brie Ferdinand de Lesseps*, and *Maurice Bernardin*.....	vig.
Sophie Coquerelle .....S	blush, centre flesh, colour clear and good, flowers very large; a fine Rose	free
Souvenir d'Arthur Sansal S	beautiful clear rose, colour of *Jules Margottin*, but brighter; flowers large and well formed.....	vig.
Souvenir de Charles Montault	velvety purple and crimson, double, very fragrant; a free-flowering and fine bedding Rose.....	free
Souvenir de Madame Robert	salmon-pink deeper in the centre, large, full, cupped, opening well, growth very vigorous, extra; a seedling from *Jules Margottin*	vig.
Souvenir de Madame Berthier .....S	fine bright red, very large and full; seedling from *Victor Verdier*	vig.
Souvenir de Victor Emmanuel .....S	vermilion-red, velveted with purple and crimson, very large and full; extra...	vig.
Souvenir de Victor Verdier S	bright dark red, shaded purple	
Star of Waltham .....S	crimson, very large, double, and of fine form, smooth petals and of good substance; a superb Rose	mod.
Tatiana Oneguine.....S	clear lilac-red, shaded with carmine, large, full, and well formed	vig.
Sultan of Zanzibar .....S	blackish maroon, shaded with crimson, flowers globular	vig.
Thomas Mills.....S	flowers extra large, full, and of fine cup shape; colour dazzling bright rosy carmine with whitish stripes; a very free bloomer	vig.
Ulrich Brunner Fils	carmined rose, very large; seedling from *Paul Neron*	vig.
Vicomte de Vigier .....S	intensely rich, velvety crimson and lilac, colour superb, large petals; a well-formed globular flower, distinct...	vig.
Victor Verdier .....S	deep rose, centre brilliant rose, a charming colour, flowers very large and full; an excellent Rose.....	free
Violette Bouyer.....S	white, shaded with pink, large, full, fine form	vig.
White Baroness	pure white; much fuller than *Mabel Morrison*	vig.
William Warden .....——S	a sport from *Madame Clemence Joigneaux*, but of a very lovely shade of pink	
Xavier Olibo .....S	rich velvety crimson, colour superb; distinct and very beautiful	mod.

FLORICULTURE IN INDIA.

The Pelargonium.

Section I.—The Greenhouse. Spring flowering. Deciduous species, that flower for a short time only in the spring or early summer months.

These were originally called Cape Geraniums from forty to fifty years ago. Pelargonium was, however, the original name given to it from Pelagos, the "Stork's bill," which the seed spike resembles. This was well known in the profession, but not generally so outside of it, as it was looked upon as a new name to distinguish this section from the scarlet or bedding section of Geraniums, and accepted as such generally until lately.

My experience in their culture commenced in 1844, when the species were comparatively few in number. The old Speculum Mundi and Alba Multiflora were then the earliest flowering ones, and would bear a little forcing whereby bloom was obtained as early as March and April. Garth's Perfection and others would not bear this, but came into flower in May and June in cool pits. The species began to multiply and improve rapidly by hybridization, and became of such importance as an exhibition plant that a class was set apart for it by the Horticultural Society as the Pelargonium class, and the first Exhibition of the season became known as the "Pelargonium Show." In course of time a Society was formed by the growers known as the Pelargonium Society, and is I believe continued by them and kept up. My experience and observations at home ended in '63. My Indian experience of this section has been confined to the Hill Stations, which commenced in 1870, when I found some introductions struggling for an existence. I will now divide the selection into three groups to explain their treatment and culture.

1. The *show* or large flowering which includes the *Regals* or hybrid double (so called) varieties; 2. *The French spotted*; 3. *The Fancy*, or small flowering.

The difference between the *Shows* single, and *Regals* double, consists in the former having five petals, each of which is shed entire, without fading, after a short display, and when cut after a few hours. The latter have seven entire petals, and occasionally a disposition of more in a smaller form, showing the tendency to become double. The petals are not shed so soon, are more persistent and lasting, either as cut-flowers or uncut, and the flowers are larger, thus forming the present climax of the section.

The *French spotted* are intermediate in size of flowers and hardihood in growth, and amongst them are the earliest blooming varieties. The markings are dense and varied to pure white.

The *Fancies* are small in size of flower, but profuse bloomers; when the old flower spikes are cut away daily as the petals fall, other heads appear and open continuously for some time: they bloom longer than either of the former. In growth they are more delicate, much smaller in leaf and stems, will not bear pruning so hard, and require no stopping, as they branch freely of their own accord, and may be trained to a semi-circular form.

Culture.—When the flowering season is over, they should be removed to a cool shady situation, with a north aspect, and gradually dried off until the wood has matured, when they may be kept dry, until the leaves are fallen or have turned yellow and will shake off. They will now be ready for cutting down, which is the general annual pruning. This operation is performed by cutting all the branches of the last season's growth away, back to within two or three joints of the last year's pruning, or the main branches where they made the last season's growth from. If the plants have been grown upon the usual flat headed or any system, and extension is desirable in circumference, or otherwise, the branches may be left a little longer in the direction to meet this requirement. In this state they should be kept without water until they break into new growth of their own accord. A verandah, shed, or any airy out-house, is suitable for them at this time, whilst taking rest. When the plants have again broken into growth, and the buds are about half an inch long, they may be shaken out and repotted. Before doing this, see that the plants are properly broken into buds, all over, thickly and properly, or they may not do so afterwards. (In this respect the plants are peculiarly sensitive at this stage; mistakes have been made in shaking the plants out before they were properly broken, and attended with failure, and may again if this is not observed.) Shake all the soil away from the roots that will come away by shaking, and remove the fine fibrous annual roots that may be in a mature state but usually die at this time. Repot into the smallest size pots that will admit the older and more permanent fleshy roots: pot firmly, and water the plants thoroughly to settle the soil about the roots, after which, care and judgment must be exercised, not to apply too much—that is, not too often. The soil should be allowed to get comparatively dry, but not quite so, from time to time, and when applied enough should be given to saturate the soil and run out at the bottom; proper drainage in the pot being a necessity that must be seen too. Allow the plants to remain in the veranda or under other protection exposed to the light, but not in the sun. When the leaves are fully expanded they may be removed to the quarters where they are to be grown throughout the winter, under glass if available, if not, covering at night must be provided to keep out frost, if any; if not, security from night depredations will suffice. Examine the roots from time to time, and when the pots are filled with new roots they should be shifted into pots a size larger, of one or one-and-half inch, for a shift each time as required.

The last shift for the early flowering varieties should be in the middle of December, and for the later ones early and late in

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January. If it is noticed that the plants, are insufficiently furnished with shoots when they have grown from three to five or six joints in length, the whole of the shoots may be topped, at any time before the middle of December, but not later; this will double the number of branches. Training must also be attended to, the outside lower shoots tied down horizontally, and the others obliquely, radiating from the centre as they require it. Keep a sharp look out for green fly, and if a single one is seen, fumigate with tobacco at once, or syringe with tobacco-water. Nothing more is likely to be wanted beyond the ordinary attention of watering, ventilating, covering, &c. In March the growth will approach completion, and the trusses of flower buds showing themselves, when the general annual tieing must be attended to. The flowering of the earliest may be expected to commence towards the latter end of the month, or in April, and in May the full flush to be on, and continue until the middle of June. A little judiciousness of dividing the whole into batches of early, medium, and late, and performing the various annual operations accordingly, at intervals of fifteen or twenty days apart, will lengthen the flowering season to three months or nearly so.

The soil most suitable is a light sandy loam, one-half; hot bed manure one-fourth; (or if not obtainable leaf soil and rotten cow dung); the remainder three-fourths sand, and one-fourth charcoal, wood ashes or burnt bones.

Propagation.—Cuttings are selected at the time the plants are cut down, from the well ripened wood, and each should be, when made, from five to six inches long and straight, to allow a stem of three inches for the coming plant or a little more. Plant them, five or six, in four-inch pots, in pure sandy loam with an inch of pure sand on the top of it; put them in a shady, close, warm, and moderately dry place; if under glass in bottom heat, so much the better, as it will save time and secure them a good start. When struck, pot them off singly into the smallest size (three-inch) pots, and when these are filled with roots, shift them into pots a size larger each time, and continue to do so until the end of February, when it must be discontinued to allow them to flower.

Training.—The cuttings when struck, may give one, two, or three shoots; stop the single one at three joints in length by taking the point of the growing shoot out, to cause it to make side branches; when these come, allow them to grow sufficiently long to train them horizontally by tieing them down, and when this is accomplished they may again be stopped and the shoots from it tied down; and this must be continued until the basement of the plants are formed. Those with two or three shoots can be tied down direct before stopping, and will have the advantage in start of the single ones. After the first shoots are tied down, and the tops taken out, three new shoots will break out from each; observe that two should be tied down to form the horizontal base, and the other topped at the third joint, and left to form upright shoots to fill the head. Those in the centre may be left a joint or two longer; to elevate it give a rounded shape to the plant. In this way the plants must be trained annually, by tieing down the outside shoots during the autumn and winter months or time of growth, until the full size is attained, if specimen plants are desired.

To allow them to bloom, the stopping and pointing must be discontinued in December for early, and not after the first of February for late flowering. The pruning must also vary, by not cutting back so hard as in the full-grown stage. After the first year's growth the shoots trained horizontally will require the tips only to be shortened if the wood has ripened, whilst those left to fill the centre and head of the plant in the upright position must be cut to the length and shape the heads may be required. The second and following years these principles must be taken into consideration, to carry out the object in view.

The formation of specimen plants must be taken in hand when the plants are young. It becomes a difficulty afterwards, and it will always be found that a few good specimens, well grown, are more effective than a quantity of ill grown rubbish, far less troublesome to attend to, and look after, whilst room and expense is economized. Space must be left between the lower branches or base of the plant and the pot, for the hand to pass, to facilitate the operation of potting, cleaning, training, &c. This is important and must not be omitted.

We wish to observe that our object with the young plants has been the culture of specimens, to succeed any of the older stock that may be ill-formed plants out of condition, aged, or that may want renewing. Moreover new and improved species are often turning up that make addition desirable to supersede the older kinds, that it may be well to discard, otherwise flowering is of secondary consideration during the first and second years of growth with the younger stock. At the same time we wish it to be understood that there is no material objection to the plants being flowered annually during their culture in to specimens. In some instances it may be a desideratum to flower the plants. An amateur commencing the culture of the Pelargonium may reasonably be anxious to see his plants flower for the first time. This anxiety can be gratified at the loss of a little time only in curtailing the growth and size of the plants for a time. It therefore becomes a consideration on his part and for his convenience and pleasure.

After the formation of the plant into a bush of a decided shape, and the size fixed upon is attained, the annual course or routine of culture is simple enough, when understood, and may be condensed thus. The winter, or season of rest, is during the rains (the Cape winter correspondingly). Cutting down, shaking out and repotting takes place, one shift follows during growth. Stopping is not required (as the plants are furnished). The annual tieing up of the flowering shoots. These are the main annual items. The diurnal ones are watering, ventilating, shading, and protection.

Liquid manure is very beneficial, if applied after the flower buds are formed and begin to appear, and during the time of flowering.

Remarks.—As the Pelargonium is an upright flowering plant, it is necessary to place it below the level of the eye when in bloom for its beauty to be seen to advantage. Hence the reason why gardeners cultivate it as a dwarf flat-headed bush or approximately so.

Its habit is that of a dwarf deciduous bush or shrub, tender and sensitive to frost, will not bear heavy rains, excessive humidity, stagnation, or swampy locale. The syringe is used sparingly, in spring only, until the flower buds appear.

It luxuriates in situations that are high, dry, and airy, with a range of temperature varying from 45° to 75° Fahrenheit's. Their culture is easy in the Himalaya Sanitariums by the aid of glass during the winter months, and may be equally so at any elevation above 1,000 or 1,500 ft. by the aid of canvas only, elsewhere in India. I cannot recommend their culture in the plains.

August 6th, 1885. EXPERT.

DUTCH FLOWER ROOTS.

There is probably no class of plants that has been so persistently shunned by gardeners in India as those which are generally described under the above title. This is no doubt accounted for by the fact that almost every writer on Indian horticulture has pronounced, in the most emphatic terms, the impossibility of ever cultivating them with success in any part of India. But is such really the case? We should certainly, from our own experience, dispute the truth of such a statement, for during the past three seasons we have flowered varieties of every species coming under this head with the single exception of the Tulip. This, we candidly admit, has up to the present baffled every attempt to cultivate it. We have every hope, however, of being more successful this season. We strongly recommend those of our readers who have sufficient leisure, and, what is of far more consequence, take sufficient interest in their gardens to personally superintend them, to commence their experiments with Hyacinths, Alstrœmerias, Anemones, Ranunculus, Ixias and Oxalis. We have here some of the most gorgeously beautiful flowering plants in cultivation, and we are assured that if the following hints regarding their culture are carefully followed, success will certainly ensue. We do not for a moment wish to affirm that we would class these amongst plants that are "easily grown"—nothing of the kind, they will require careful and constant attention, and where this cannot be given they had better be left alone."

HYACINTHS.

Hyacinths in Beds or Borders should be planted in October or November. They do well in any light garden soil. Turfy loam,

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with a plentiful admixture of sand and well-decayed manure, is, perhaps, the best of soils for them; and if the natural soil be so stiff and adhesive as to require modifying, these are the materials that should be used. The bulbs should be planted with their crowns four inches below the surface, covering the ground after planting with two inches of loose pulverised manure. Hyacinths planted out of doors seldom require any water, and if the soil or situation be at all damp they will do better if the soil in the beds or borders be raised an inch or two above the surrounding level; this method of growing Hyacinths is well adapted for Hill Stations, but should not be attempted in the plains.

Hyacinths in Pots may be potted from September to Christmas, in order to secure a succession of bloom. October is, perhaps, the best time for potting the mass. If new pots be used they should be soaked in water before placing the soil in the pots. Fill the pots with the same compost as recommended for "Hyacinths in Beds." 5 and 6-inch pots are the sizes ordinarily used. In potting, one-third of the bulb should be left above the surface of the soil, and the pots should be placed on the level ground out of doors, having previously taken the precaution to prevent the ingress of worms through the holes at the bottom of the pots. Cover the crown of each bulb with a small pot, and the whole with six inches of cinder ashes, coarse sand, or any porous material, leaving them so covered for at least a month, then removing them at intervals as required to a cool frame house. As the leaves expand place the pots close to the glass; give plenty of air, and attention must be paid to watering; and as the foliage and trusses advance, occasional waterings of liquid manure is very essential. When the blooms begin to expand, the temperature may be gradually lowered; and when fully expanded, the plants may be taken to a cool house or room where there is plenty of light.

Hyacinths in Glasses may be put in, in October or November. The bulb should be placed, in the first instance, with the lower end not quite in contact with the water. Pure rain or pond water should be used, and not changed unless it becomes offensive. When the bulbs are placed in the glasses, they should be placed in a dark place for about a month, then gradually inured to the light, filling up the glasses as the water diminishes. The bulbs will flower in the greatest perfection if placed in a cool airy situation, well exposed to sunlight, but it is usually desirable to place some at least in a warm situation, to accelerate the period of flowering.

TULIPS.

The routine of pot culture is practically the same as for Hyacinths of the early kinds; three or five bulbs may be placed in a 6-inch pot, the later kinds and larger bulbs are best placed singly in 4-inch pots.

POLYANTHUS NARCISSUS.

Should be planted in September and October. Its general treatment is similar to that of the Hyacinth. For early forcing the *Paper White* and double *Roman* are very useful, and when potted early in September, produces a profusion of bloom by Christmas. *Bazelman Major*, *Soleil d'Or*, and *Staten General* are each highly recommended for the greenhouse, or indoor display. *Gloriosa superba* is an exceedingly beautiful variety, producing large heads of blooms of rich colour.

ALSTRŒMERIAS.

How rarely one meets with these, and yet how beautiful and easily managed they are. For supplying cut flowers there is nothing to equal them either for beauty or lasting qualities. Many of the best varieties rival some of the Orchids, which they closely resemble, both in the singular form of the individual flowers, as well as in their delicately marbled or spotted petals. The flowers, too, are of great substance, and as the stems are very open and soft, this accounts for their great lasting properties when cut. In the herbaceous border they are unrivalled, and a stand of cut flowers without Alstrœmerias is deficient in one of the choicest and most attractive of the many choice things belonging to that class of plants. Ample, thorough drainage, and a light generous soil with plenty of root room is all that is essential to ensure success in the cultivation of this lovely gem.

IXIAS.

These beautiful plants are universally admired for their graceful and elegant style of growth, and ought to be more extensively grown on account of their richness and contrast of colour. In the Hills they may be cultivated in beds or pots. The beds should be raised about six or nine inches high in a warm situation, well drained. Plant the bulbs in October, four inches deep, with a little sand round each, then with fine soil. If cultivated in pots, plant four or six in a pot, two inches deep, with some good fibrous loam, leaf-mould, and sand; place a little sand over the bulbs; press them firmly down and fill up the pots with soil; water freely and plunge the pots in ashes. The latter method is best adapted for Bengal.

ANEMONES.

Anemones are a highly ornamental class of easily cultivated plants, with large flowers of nearly all shades of colours. They grow and flower well in any moist fertile soil, planted two to three inches deep and four inches apart. In the hills they may be grown in the open ground, but in the plains only pot culture should be attempted.

CULTIVATION OF THE ANEMONE.—Soil: For pot culture, use a compost of good loam, well-rotted cowdung, and sand, which should be well incorporated, and examined for the extirpation of wire-worm or other obnoxious grubs. For border culture, any good garden soil will suffice, provided it be well drained and moderately light. For pots we prefer that the pots should be half filled with the above rich compost, then a layer of pure sandy loam, on which to place the tubers, and cover two inches deep with the same.

TIME OF PLANTING.—For a good succession it is advisable to plant a few in September, the principal bulk in October, which will insure a succession of bloom up to the middle of June. In the Hills, if planted in November the roots are liable to be injured by frost before they have commenced their growth.

CULTURE IN POTS.—Use the compost before alluded to, place the pots in a cool place and sparingly water until growth commences; in the Spring they may be removed to the house, but will not bear too high a temperature. They are subject to mildew; a good preventive is to mix *sea sand* with the compost, or, if that be not procurable, a little salt; ammoniacal liquor, very much diluted, is a good application after infection has taken place.

RANUNCULUS.

Among dwarf flowers the *Ranunculus* is unrivalled for its lovely form and its brilliant and attractive colours, white, crimson, yellow, purple, and black. They present nearly a round of the most gorgeous colours, combined with a compactness and symmetry unequalled in any other flower. The individual flowers are about two inches in diameter, beautifully imbricated and as full and double as the finest Camellia or Rose. No Florist's flower is so rich in distinct and brilliant markings. They must be grown in a cool shady position, using a light rich soil, planting tubers about two inches deep and 3 or 4 inches apart in the pots.

OXALIS.

The genus Oxalis contains many beautiful objects, which, we are sure, only require to be better known to bring them into general favour and cultivation; with the exception of *Bowiei* and *Deppei*, they are scarcely known. They are nearly all neat growing and of simple culture, luxuriating in a mixture of sandy peat and loam. For an interesting note on the cultivation of this genus, See Vol. I, page 291.

(*To be continued.*)

WORK IN SEASON.

THE VEGETABLE GARDEN.

This is a busy month indeed, and every exertion will be necessary to get work forward. The present favorable weather furnishes a good opportunity for getting the great bulk of vegetable seeds into the ground. On this subject, however, we would give a word or two of caution. In all soils, and especially those stiff and retentive of moisture, two things tend greatly to ensure success. First, make sure seeds are not too much covered, as that places them beyond

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atmospheric influence; and second, better defer sowing until the ground is in a nice dry friable condition, than sow at any calendiarially indicated time, when the ground is wet, sour, and unpulverised: a difference of a week or ten days in sowing will be more than made up by the free and vigorous growth afterwards. There are many more failures from sowing deep than from sowing shallow. One rule is applicable to all seeds small or large—namely, cover with as much soil as the thickness of the seed. This, in general, will ensure at that season sufficient shade and moisture; and though a little more covering may be given in light soils with safety, the deep covering instead of the slightest dusting destroys many seeds of such things as Calceolarias and Lobelias, and then the seeds get the blame that ought to be laid to the treatment given.

CAULIFLOWERS.—Cabbages, and the whole Brassica family, should be planted out without delay, choosing an open situation and well manured ground; supply the plants freely with water till established.

CELERY—should also be planted out as soon as the first batch of seedlings are large enough. Do not wait till the plants are very large, as small, sturdy plants take more readily to the soil and become established much quicker than those of larger growth. Single lines of plants in the trenches are the easiest to manage. The trenches may be eighteen inches wide and four feet apart. Do not cramp the plants, should there be no ball of earth attached, lay them out flatly and cover firmly with soil. If the plants have been pricked out as previously advised, place the flat ball directly on the manure at the bottom of the trench and cover with soil. Unless extra large sticks are required a distance of nine inches apart will suffice. Remove all suckers from the plants previous to planting, and the latter operation, unless dull weather prevail, is best done in the evening. In either case well water the plants and sprinkle them over head frequently till established.

Celery will grow very well in rather rough rankish material, but it will not taste so sweet, nor keep so well, as when helped with well-rotted, well-exposed manure, of which decomposed leaves form a principal part. Where room is an object, grow Celery in beds, say four and-a-half feet wide, and three rows in a bed. A little shade for three months does much for the welfare of Celery, such as may be given by a row of staked Peas between the rows or beds. Mistakes in culture would be avoided if we recollect that the Celery flourishes naturally in ditches, where the water is shallow, and the banks give more or less of shade. Let the trenches be well manured, and give the plants an abundance of water.

PEAS.—Sowing of these should now be made, selecting dwarf varieties such as "William I." "Little Gem," or "Blue Peter." These should be followed after an interval of a few days by later growing kinds, such as "Advancer," "Supreme," "Telephone," or "Telegraph;" four or even five feet between the rows is not too much for the latter varieties, and a row of Cauliflowers or Cabbages may be grown between. Peas should always be sown in rows running from North to South, as all the plants are then equally exposed to sunlight.

ONIONS.—The first favourable opportunity of sowing seeds of this vegetable should be taken. Choose a good open situation, heavily manured and deeply dug. Do not attempt to sow if the ground is at all wet; as a firm soil is requisite if well formed and solid onions are wished for, and the trampling necessary is very detrimental unless the soil is tolerably dry. Previous to sowing a dressing of either soot or wood ashes, or some of both, and also a slight sprinkling of salt may be stirred but not turned in with a fork. Sow the seed in shallow drills about nine inches apart.

A first sowing of Dwarf French or Kidney Beans should now be made. Negro or Canadian Wonder are good varieties. Broad Beans should also be sown. Sow Lettuce seed every fortnight, so as to secure a regular supply. Basil, Sweet Marjoram, Thyme, Sage, Savory and other herbs should now be sown.

The principal crops of Turnips, Carrots, Beet, &c., should also be got in as soon as possible. Tomatoes sown last month should now be ready for transplanting; these require a light, rich soil, and a partially shaded situation suits them best. Sowings of Cabbages, Cauliflowers, Savoys and Brussels Sprouts may still be made for successional crops, and continue to prick out the seedlings from former sowings as soon as they are large enough to handle.

Plant beds of Globe Artichokes in soil well trenched and manured, also of Jerusalem Artichokes; they like freshly broken up ground.

THE FLOWER GARDEN.

We have now arrived at the most important period of the whole year for the Gardener in the plains, as it is mainly on the work of the next month that the success or failure of the season's operations depend. As soon, therefore, as we can rely on the weather being settled, we should lose no time in making our preparations for commencing the ensuing campaign.

It is now time to sow most kinds of annuals, and especially those intended to be used in the general bedding arrangements. The immense number of new species that have been introduced have pushed to the rear many good old kinds of the annuals that twenty years ago did excellent service for our predecessors, and to this hankering after novelties, may be attributed the vast numbers of the failures we so frequently hear of in the cultivation of this desirable group of plants. For in this, as in more important matters, we too often overlook the virtues of an old friend—"tried and true"—in our admiration for the more fascinating, though perhaps fleeting qualifications, of a stranger. Not that we would condemn all the more recently introduced families of annuals—on the contrary, there are many of them strikingly beautiful, and which will thrive most satisfactorily amongst us; but still, to the experienced amateur, we would certainly say be content with what has already been tested and proved in this country, for new varieties of seeds, as with new species of plants, should always be approached with caution, and it is better to await the result of trials by some more practised hand before venturing to have anything to do with them.

Mignonette, Sweet Peas, Candytuft, Bartonia Clarkias, Poppy, Portulaca, Lobelia, Lupins, Nasturtiums and other hardy annuals may be sown as soon as the soil is in good order. These will germinate much more quickly, and also more certainly, if covered with a mat or some other shading till the plants are well above the ground, but after this, the more they are exposed the more robust will be their growth.

The first sowings of Asters, Pansies, Cinerarias and Verbenas should now be large enough for pricking out; this may be done either into other seed pans, placing them about three inches apart, or into small pots; we prefer the latter system, as the next shift can then be made without much injury to the roots.

Phlox Drummondi, Dianthus, Antirrhinum and other annuals, the seed of which were sown at the end of last month in pans, will also soon be ready for pricking out into pots or other pans; use light rich soil, and as soon as the seedlings are well established give occasional doses of weak liquid manure to stimulate their growth, where, however, the plants have come up very thinly in the pans they need not be transplanted, but should be allowed to remain till large enough to place out in the open ground.

Hybrid Perpetual Roses that are required to bloom early may now be pruned; it is better, however, to let the general stock remain till the end of the month. When we have a late rainy season like the present, the longer pruning is delayed the better ripened the wood will be, and, as a natural consequence, the plants will break more regularly and flower more freely.

Chrysanthemums should now be in their blooming pots and growing vigorously; they should be kept in an open part of the garden where they are fully exposed to sunshine As this plant is a very gross feeder, it not only requires a richer compost to grow in than most other plants, but must also be liberally supplied with stimulating food. Water should be sparingly applied to the roots till the pots are well filled with roots, and then it is not easy to over water them. The plants are very liable to attacks of thrip and green fly; these pests can be destroyed by dipping the leaves in soft soapy water to which some tobacco liquor has been added.

Hyacinths, Oxalis, Ixias, Narcissus and other imported bulbs should now be planted.

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LONDON OFFICE

OF

THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

1, Whitefriars Street, London, E. C.

Correspondence.

TO THE EDITOR OF THE "INDIAN GARDENER."

DEAR SIR,—In answer to M. H.'s enquiry in your issue of the 22nd instant regarding a yellow-flowered Eucharis, I should say there is no such variety in cultivation, but if there is, it must be of recent introduction, and it has not yet got into the catalogues of European bulb-growers.

I know that less than a year ago the only known varieties of the genus Eucharis were E. grandiflora (Syn. Amazonica); E. candida; E. Sanderiana; E. subedentata (Calliphruria of some); and E. Hartwegiana.

The first three named are excellent garden plants, the others are not of much value, as they seldom flower under cultivation; all the five varieties bear white flowers.

I never heard of any process by which a white-flowered Eucharis could be converted into a yellow one, and I imagine it would be hopeless to attempt it so long as there is only a white variety to work on.

Has M. H. not made a mistake in writing "Eucharis" for "Calla"? The yellow variety of this genus, "Calla hastata" is extensively grown in England for the Covent Garden market, and is apparently more highly prized than the old white variety.

Can any of your readers kindly inform me in what part of India the shrub named "Desmodium gyrans" is to be found? It is a native of this country, and has the peculiarity of moving its leaves up and down with the regularity of the pendulum of a clock, though not so fast; it grows to a height of three feet, and I fancy it would be quite a curiosity to have in one's garden or fernery.

Yours faithfully,

Liliumpore, September 30th, 1885. JONQUIL.

ANSWERS TO CORRESPONDENTS.

MUSSOORIE:—In your climate the Camellia should thrive to perfection. Select a position where it would enjoy the morning sun and be, if possible, shaded during the remainder of the day. For the tree Fern you will require to select a moist shady situation; this will probably require protection during the winter.

We do not think that you will be able to procure the green Dahlia in Calcutta, although it was in cultivation here a few years since; like all such monstrosities, however, its day was a brief one.—ED., *I. G.*

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to, should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

THE HYACINTH.

There can hardly be found, for decorative purposes, a more intractable plant than the Hyacinth. Of course we refer to its state when in bloom, as prior to that condition it has no decorative merit whatever. But though there is much gaiety and sweetness about the spikes of bloom thrown up and some variety of colouring, there is in the build and form of the bloom-spike so much of stiffness and monotony that it seems impossible to feel towards it any degree of admiration. A large collection of Hyacinths is stiff and formal to a painful degree. There is about as much of charm or sentiment in such a group as there would be in a series of wooden posts. Even if there be some diversity of colouring, and that diversity is not very varied, there is just the same formation, and that sameness becomes distressing to look upon. Those who have seen Hyacinths in flower-beds in some well kept garden in the month of April, the spikes dotting a carpet of Pansies, Violas, Daisies, Aubretias, or similar hardy flowers, have thought the effect singularly pleasing, and not the less so that the spikes were not of that painfully precise form aimed at in show flowers, and that they were looked down upon.

Collections of Hyacinths at shows are, however, rather like soldiers drawn up in ranks for inspection. They are seen rather laterally than obliquely, or vertically, hence whatsoever in them is stiff and formal is too evident. Sometimes too there seems to be a painful impression that such a collection resembles a gathering of ninepins, and is set up that they may for sport be knocked down again. Unfortunately in such case one knocking down would suffice, and the setting up again would be as difficult as in the case of the celebrated Humpty Dumpty, whose overthrow was a cracker even for all the king's horses and men.

Of course we have no intention to decry the Hyacinth, for it has its myriads of admirers as a spring-blooming plant, and it is a very important article of trade and culture. The Hyacinth cannot well alter its nature, and everything done towards its improvement does but tend to make the spikes denser, stiffer, and, from an artistic point of view, the more objectionable. It is ever the case that a spike just a little lop-sided, and with bells not too closely set, so that they may hang somewhat irregularly, is the most natural, and to those who view flowers as essentially natural, of course the more pleasing. That view of course is not the one taken by the connoisseur and florist, for he looks for solidity, stiffness, height, and fulness, with the bells of good substance and form, and evenly arranged. Given those elements, and the spike is perfect. The wild Hyacinth of the woods is to the artist far more picturesque than is the grandest spike ever seen on a show table. But whilst we refer to these things, we are neither carping nor objecting, only so far as relates to the present mode of staging Hyacinths, and that certainly is open to improvement.

The show season is now over, but ere it comes round again will some one generously offer to our big growers prizes, not for the best collections, but for collections most elegantly and artistically grouped or arranged. For this purpose, absolutely the finest show spikes are not essential, still less needful is it that the plants should be all presented as if in uniform, and in abnormally big pots in which they are not grown. A base of fern or other decorative plants such, for instance, as Spiræa japonica, not in bloom, should form the dressing, and in this the Hyacinths, grouped in circles of colours, or in serpentine lines, or in diamond patterns, the small groups either of self or mixed colours, or in any way which may seem to produce the most pleasing effect. Plant decorators or floral artists ought to find no difficulty in creating patterns or designs in which stiff and stark Hyacinth spikes, intractable as they are, might yet be found to play an artistic and pleasing part. There can be no doubt that in these more art-loving days the absolute formality seen in

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collections of show Hyacinths militates against their wide sale and culture. The common remark is, "Rich perfume certainly, but the spikes are far from pleasing." It should therefore be the aim of large growers, in presenting their collections to the public gaze, to lend to them some artistic charm, they now fail to display.—*Gardening World.*

HONEYDEW.

Soon after we lose our annual scourge of east wind, and the trees in our woodlands have developed their foliage to its full extent, we shall hear, as usual, that there has been a "great fall of honeydew." Though the origin of this mysterious deposit of sweetness has long been settled in the minds of naturalists, there are still those who, year by year, ask whence it comes. It is the nectar of ancient poets, who supposed it to be distilled from the skies, and even Pliny, observant as he was, could not satisfy himself whether it was the sweat of the heavens, the saliva of the stars, or was produced by the purgation of the atmosphere. No wonder that much dispute as to its origin occurred in those times, for the evenness of its distribution on the leaves, and in some seasons the amount of the deposit, would neither be likely to guide the investigator to the source whence it came. Chemists have analysed it, and found that its component parts were almost identical with cane sugar.

To the aphides we must turn for an explanation of this phenomenon. It occurs only when the presence of plant-lice is observed, and it may be that it is intended by nature as the first food of the young of these delicate insects; but its use, or intention, has by no means been satisfactorily settled. As the whole first duty of aphis-life appears to be the extraction of large quantities of vegetable juices, these must turn to something after the absorption of the necessary support for the insect, and it may be that the excreta have something to do with the deposit of honeydew. There is, however, no doubt that it does come from the aphides, for by keeping certain species in an absolutely clean glass box, it will be found that the bottom will soon be quickly covered by minute specks of the unctuous fluid.

There are certain processes or organs, which are to be found on microscopical examination of the sixth abdominal ring of aphides, and which are known as cornicles or nectaries. These are of horny substance, and are connected with what are apparently excretory ducts. These cornicles are much more highly developed in some families of aphides than in others, while in a few they are altogether absent, among the latter being the genus Phylloxera. That honeydew is deposited largely through these ducts, there is little doubt, and one observer has stated that he has seen the very young of some species sucking the limpid fluid as it exuded from the nectaries. So it is probable that they may serve in certain kinds of plant-lice the double function of getting rid of the fluids no longer required in the body, and these in turn may serve as the first food of the very rapidly-produced offspring. Ants are known to hunt closely for aphides, but not always to kill and eat them, for they are collected and even herded like man keeps his cows, that they may be milked and so produce him food. And so it is with the ants, they herd the aphides and feed upon this sweet exudation, rather protecting their aphid cows than doing them injury.—*Field.*

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THE CULTIVATION OF ANNUALS.

Arrangement of Colours.

It is probably a better understood, and in some respects an easier matter, to propagate and cultivate the necessary stock of plants to fill up a Flower Garden, than to arrange them according to the laws of colour, or so as to produce a pleasing and harmonious effect. In many respects even those who are best versed in the principles which ought to guide the gardener in this important matter, have difficulties to contend with which are unknown to the most intelligent colour-theorist. One of those difficulties—and one that is not easily overcome—arises out of the varieties of height and habit of the plants, which are to the gardener what paints are to the painter. Another very formidable one is the unsuitableness of many garden designs, especially in those where the beds are very large and too close together, or, what is equally unfavorable, they may be long and narrow, and much too near the points from which they can be critically viewed. Under such circumstances it is not unfrequently most difficult to apply the principles of either harmony or contrast of colours, and at the same time give essential prominence to symmetry; modification is therefore forced upon the gardener, and, consequently, very much depends on good taste and long and careful observation in combining plants of various heights and in dealing with designs which are unsuitable for purely scientific arrangement. But at the same time there are few places, not even in the smallest of gardens, which do not afford an opportunity to some extent for a definite system of arrangement. A single bed in an isolated position, may be made to display the effects of either harmony or contrast, or both, in flower gardening, and even where such difficulties as we have named exist, there is no doubt, as we have previously remarked, that glaring errors are only to be avoided by having a knowledge of the simple elementary principles which govern the harmony and contrast of colours. Experienced practitioners have generally by them a plentiful store of notes carefully made in former years when the flowers were in their prime. Each combination of plants that, though not strictly according to scientific dicta, has been chaste and pleasing, has been carefully noted; and the planting of a flower garden to such becomes a work of much less difficulty than to the inexperienced. But it is impossible to apply individual practice to a great variety of circumstances and designs, and for that reason theory is here of more than usual importance.

Arrangement of Colours according to the law of contrast.—The experiment of admitting a ray of sunlight through an aperture into a dark room, and after it enters making it pass through a triangular glass prism on to a white wall on the opposite side of the room, analyses the light and shows us of what colours it is composed. Immediately on passing through the prism it is dispersed and forms on

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the wall an oblong figure of seven different colours. This is in fact light analysed and its component parts shown, analogous to the way a chemist acts upon matter. Newton, the great philosopher, has denominated these seven colours simple or homogeneous.

The better to understand the arrangement and relation of these prismatic colours let them be printed on a circular card in the order and proportion exhibited by the prismatic spectrum and rainbow. The circle is divided into 360 degrees, which allows space for each colour in the same proportion as in the spectrum, namely violet, 80°; indigo, 40°; blue, 60°; green, 60°; yellow, 48°; orange, 27°; red, 45°.

Here we have the simple prismatic colours arranged in the same order and proportions as are demonstrated by the prismatic experiment, only in a circular instead of an oblong form, in which latter, as produced by the prismatic rays, violet forms one extreme and red the other. Red, blue and yellow have been termed the three primary colours because the others can be produced by mixing these in different proportions; and it will be observed that the other colours,—violet, indigo, blue and orange—are intermediate to their arrangement in the spectrum. Now in order to ascertain correctly which are the contrasting colours, we will take violet, and wishing to find its contrasting colour we have only to find out which colour is directly opposite to it on the diagram, now if we draw a line from the centre of the space occupied by violet to the opposite side of the circle, its terminal end will be in green, but near to yellow, which determines that the contrasting colour to violet is green with a little yellow mixed, or bluish-green: and so on, by drawing a line from the centre of the remaining arc—the end of the diametric line—determines the contrasting colour.

M. Buffon, a good many years ago, made an interesting discovery, which is practically very useful, and very closely approaches in correctness the diagram principle in determining the colours which contrast. He discovered that if a wafer be placed on a white sheet of paper and gazed steadily at for a few seconds, and then the eye removed to another part of the paper, a spectrum of the same size as the wafer, and of its contrasting colour, will be seen. The spectras are, however, rendered more distinct when the wafers are looked at on a dark ground and the eye then directed to a white ground. This simple fact is the reason why black printing is more comfortably and easily read on a white ground than red, for red would have a contrasting green spectrum floating before the eyes on a white ground; white being the contrast to black, the spectrum is prevented in such a combination. By this simple process, as well as by the aid of the diagram mentioned, the colours at the disposal of the flower gardener can be arranged according to the law of contrast. The following is a table of the colours and their contrasts:—

Black,	...	...	White.
White,	...	...	Black.
Red,	...	...	Bluish-Green.
Orange,	...	...	Blue.
Yellow,	...	...	Indigo.
Green,	...	...	Reddish-Violet.
Blue,	...	...	Orange.
Indigo,	...	...	Orange-Yellow.
Violet,	...	...	Bluish-Green.

These are the contrasting colours as determined according to Buffon's spectrum discovery, and it will be found that these results closely correspond with those determined by the rules of the diagram. The merest tyro will find the application of these rules of great service in the arrangement of flowers on the principle of contrast. Of course there are intermediate shades to be dealt with not embraced by the colours included in the spectrum, and just in the proportion as these shades approach the various prismatic colours, so must the rules be modified and applied. Buffon's system can always be resorted to as a guide sufficiently correct for all practical purposes, and if followed as closely as the various shades and different heights of plants will allow, cannot fail to be of great service in flower-garden arrangements.

Arrangement of Colours according to the law of harmony.—Colours are said to harmonise when different shades blend insensibly into each other. This is easily determined by any one who has a perception of, or, what is generally termed, an eye for, colour. Harmonising colours can be as readily determined by the use of the diagram which has been described in order to show those that contrast. That which harmonises with any original colour is always next the original and between it and the contrasting colour in the order of the diagram. Following out this it will be seen that red is the harmonising colour to orange, blue to violet, yellow to white, and so on.

Practically speaking, harmonising colours are considered more easily detected than those that contrast; take for instance red or scarlet, dark pink, pale pink, and white, and place them in the order named, and a pleasing harmony from red down to white is the result. The transition is gentle and beautiful, something like a plaintive melody in music. Then again take a purple flowering plant with a shade of red in it and place it near a crimson, or let a golden-leaved plant be associated with another species having silvery foliage, and a most delicate and pleasing harmony is produced, and becomes delicious food to that man who "does not live by bread alone."

These examples are enough to show what is conveyed by the term harmony of colours; and there are few things that afford more pleasure to an eye, however slightly trained to colour, than the contemplation of the soft gradations that may be worked out in a bed of flowers associated according to the principle of harmony. It is somewhat degrading to the art to look upon it merely as a means of embellishment capable only of tickling the eye.

Harmony and contrast may also be illustrated with charming effect in one design or bed. What, for instance, can be more lovely than a centre of yellow, with a corresponding zone of white finished off with a fringe of blue or purple? The two centre colours harmonize while the blue contrasts; or if two contrasting colours—yellow and blue—are mixed in the centre of a bed, and edged with red, which harmonises with the orange, the effect is very fine. In filling a bed with three colours in distinct zones, the two harmonising colours should always be in the centre and the contrasting colour as a margin, and we prefer the softest colour always in the centre. This system of planting is particularly applicable to an isolated place, because the eye comprehends and grasps the design better with the soft colour in the centre than at the margin. With a strong

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colour for a centre the eye is tyrannically attracted to the weight of heavy colouring.

(*To be continued.*)

Editorial Notes.

THE largest field of pine-apples in the world is on an estate in the eastern district of New Province, Bahamas. From one spot it is possible to see, at a single glance, 1,200,000 pine-apples growing.

THE English name of the Pea appears to be a corruption of the Latin *pisum*. Tusser and Gerarde both wrote it "peason." Dr. Holland, in Charles I.'s reign, spells it "pease," since abbreviated into "pea."

MUSHROOMS IN COAL-MINES.—At the bottom of the Raith Colliery shaft in Fifeshire, which is eighty fathoms deep, and where horses are largely employed, mushrooms grow to an enormous size. They have been partaken of cooked and made into ketchup, and suggest the idea that mushroom-growing on a large and profitable scale may be very successfully adopted "down in the coal-mines." This edible fungus is found in perfection all the year round. In France the mushroom is cultivated in caves which may not inaptly be likened to mines, such is their depth and extent.

DRIED FRUIT.—In Germany, especially in the country, most families lay up a store of dried apple slices for winter. The apples are peeled, any bruised or grubby spots being cut away, and then cut into slices and strung on a thread by help of a thick needle. This festoon is hung in the sun, in wet weather being suspended from the kitchen ceiling or walls. Mushrooms are treated in the same way, and, if used in hashes, stews, &c., impart a most excellent flavour. Pears may be treated in the same fashion as apples. Bilberries and plums are also dried. These require daily turning.

FENCE POSTS.—A writer in *The Maine Farmer* thus expresses himself in regard to setting fence posts:—It has commonly been stated that posts set top end in the ground would last longer than when set with the butt end down. We recently had occasion to remove a fence which had been set eighteen years, and to our surprise the posts set top down were still sound and strong, while many of those set the reverse were rotted entirely off. We have before found evidences of the greater durability of posts set in this way. If general experience corroborates our own, it is a matter well worthy of wide attention.

ROOTS IN DRAINS.—In a paper recently read before the Edinburgh Botanical Society, some curious cases were cited of the entire occupation and stoppage of drains by roots of trees. In one instance a 2-inch pipe, with sockets, laid in an orchard a foot below the surface, was completely filled with the roots of an apple tree. In another, a root had entered a lead pipe and grown and branched into numerous fibres which filled the pipe for a considerable distance. The strangest case was where a willow growing near a dam had sent roots twenty-five feet beneath a road, and penetrated a large leaden drain-pipe seven feet below the surface, and stopped it. The pipe was taken up and cleared, and the tree cut down. The drain was relaid, but some time afterwards was again stopped. It was then found that the stump, which had sprouted, had sent a mass of rootlets into the drain, which had filled the pipe solidly, although their connection with the tree was only by a single fibrous rootlet.

THE AMERICAN EXHIBITION OF 1886.—We learn from *The American Eagle* that the site selected at West Kensington will furnish ten or twelve acres of ground for these purposes, and afford ample space for the display, in climatic sequence, of exclusively American Conifers, and other plants, shrubs, and flowers, including an avenue commencing with those found in the Northern and Eastern States, and ending with those of the Southern and Western States. The exhibition will include a Californian wine-shop, Florida fruit stores, an Indian village, and Indian canoe-makers and mat-weavers. Restaurants, with the products of the Eastern and Pacific coasts and of the Northern and Southern States, characteristically prepared and served by white and coloured male and female cooks and waiters, will help to mark the peculiarities and variety of American social development.

JAMAICA FERNS.—Jamaica, as is well known, is particularly rich in Ferns. Although the island is comparatively so small, it contains about 500 species of Ferns, which is one-sixth of the Ferns of the whole world. To express its richness in another form, it is mentioned in the last report of the Botanic Gardens of Jamaica, that within an area about the size of Wales, Jamaica contains twelve times the number of Ferns found in the British Islands, and more than ten times the number of Ferns found in the whole of the United States. The Jamaica Ferns are remarkable not only for their number, but also for their great variety and beauty. They are found in all sizes, from those scarcely a quarter of an inch long to large tall-towering trees 40 to 50 feet high, and with stems 6 feet in circumference. Again they are widely distributed and found in all districts, from the arid plains of St. Catherine and Clarendon to the highest peaks of the Blue Mountains; from the calcareous rocks of the northern coasts, bedewed with ocean spray, to the cloud-capped ridges of the highest mountains.—*Gardeners' Chronicle.*

APHIDES AND STRONGLY-SCENTED PLANTS.—The predilection of aphides for the leaves of highly-scented conservatory plants and plants bearing fragrant flowers is certainly remarkable. For instance, the strongly-perfumed Pelargoniums are peculiarly liable to become infested; others, with the exception of the Ivy-leaved, the leaves and scent of which bear so extraordinary a resemblance to the plant after which it is named, are never, or "hardly ever," thus blighted; and it may be noted that the stronger the odour the more liable to aphis attack—the Nutmeg, the Oakleaf, the Lemon, and the old-fashioned "Unique," with its scent of Peppermint, being especial penchants of green fly. Look, too, at the Rose ("sweetest flower that grows"), at the Lemon Verbena, the Daphne, and the Carnations, how thickly covered they all become with the detestable little pests. With plants out of doors the rule seems to be reversed, for whilst Gooseberry and Currant trees, white and red, are frequently sadly disfigured by thick swarms of aphides, the aromatic Black Currant and the poisonous (?) American Ribes escape unmolested. The only probable reason for the preference given to the scented plants of glass-houses is that they are, as a rule, more succulent and juicy than others.—*Entomologist.*

USES OF VEGETATION.—The proper function, or one of the right uses of all vegetation, is to produce food and clothing for us from the refuse matter of our large towns. Every little green leaf, apart from its individual beauty, has a share in the great work of purification which all leaves carry on. In malarious countries the Blue or Fever Gum tree is now largely planted, because it grows rapidly, and its roots and leaves suck up moisture so rapidly that a few of these trees actually drain any swamp or marsh near or in which they are planted. It is so with our own Poplar trees, which in wet low-lying places act most efficiently as the best of natural drains for a stagnant bit of marsh land. Now, if you drain a swamp in the ordinary way you simply carry pollution from one place and deposit it in another place; but tree roots suck up offensive matter, and tree leaves actually purify it. The leaves throw off pure water by evaporation, and with it life-giving oxygen, instead of the poisonous gases of the atmosphere. What is true of large trees in degree is equally true of the smallest win-

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dow plant. The highest mission of plants is not merely to please our eyes with colour, our mouths with delicious fruits; not only do they do this and more, but they are ever silently but surely eating up what is impure and injurious to ourselves in the atmosphere and in the earth all around our homes; and any dwelling in which plants are well and healthily grown will be more likely to be a clean and healthy house than if the plants were not there.—*Gardeners' Chronicle.*

Soaking Seeds.—The practice of soaking such seeds as Peas, Scarlet Runners, and Broad Beans before sowing is not, I regret to say, discontinued by many amateurs and others, although the practice has been often condemned by practical men. I was forcibly reminded of this to-day by a neighbour who a month ago came for a few seeds of Scarlet Runners which he took away, as I thought, to sow directly, but instead of doing so he threw the Beans into a bucket of water and there allowed them to remain for twenty-four hours; then he sowed them in the ordinary way. To-day he came to me and said the Beans which I gave him could not have been good ones, as not one had grown. For the moment I was perplexed to know how to account for so signal a failure, seeing that Beans in our own garden, sown about the same time and out of the same bag, had every one grown. However, it soon struck me what was the cause. I inquired if he had not soaked the Beans before sowing them. To this he replied in the affirmative. It was clear that the soaking had caused the mischief, and it cannot be too well known that under the most favourable circumstances the practice is bad; it is especially so in the case of seeds sown so early in the season as the beginning of May. Even in the most favourable seasons the ground is not warm enough then, even if it should be dry, to cause such seeds to vegetate quickly, and in such weather as we had during the past month, when there was continuous low temperature and the soil wet and cold, many seeds properly treated rotted in the ground before they could vegetate, how much more likely would they therefore be to do so when they were just in a condition to burst into life. When seeds are dealt with in such a manner we need not seek far for the cause of failure, and I hope this note of warning may be the means of its being better understood that the soaking of seeds of vegetables is a bad practice at any time, and that those who practise it must not be surprised if they meet with failure when they least expect it.—*J. C. C. in The Garden.*

Original Articles.

THE ROSE.

Tea Roses.

Next to the Hybrid Perpetuals the most important group are the Tea Roses. The former have maintained their pre-eminence on account of their greater diversity of colour and form, and also to the fact that they are more hardy, easily grown, and withstand rough treatment much better than the more delicate Teas and many other classes of roses.

The Teas, however, are, so to speak, much more refined, more distinct as a class, and certainly more chaste and beautiful; and though embracing comparatively but a limited range of colour, the blending of tints in these colours almost bids defiance to any proper description being given of them; their peculiar delicate fragrance is also distinct from any other group.

Mr. Shirley Hibberd, in his "Amateurs' Rose Book," thus eulogises this beautiful family: "These are universally regarded as ranking higher than all other roses in the scale of floral excellencies. They are of less value, certainly, than the Hybrid Perpetuals, because less hardy and less variable in style and colouring, but their delicious fragrance, refined colours, and highly finished outlines fill the true rosarian with highest rapture, and engage him to bestow upon Tea Roses the best of his attention and the largest share of his love. To grow Tea Roses is indeed an object worthy of the ambition of the most ardent horticulturist—the more to be esteemed perhaps because it is attended with difficulties. The shallow pretender who thinks to accomplish wonders without first preparing his mind and hands for the task, will surely be disappointed, for it is to skilful management alone that these coy and capricious flowers make the response that is desired. They appear to have been designed by Nature to furnish the highest test of skill and patience in rose culture, and to afford constant evidence of the fact that the cultivation of Roses does not consist in merely buying the plants and sticking them in the ground, and then pruning them with a knife and fork, according to the plan of the jobbing gardener, who thinks that trees of all kinds should be cut down and done away with.

The prevailing characteristics of the group are the production of long rods armed with hooked spines of a brownish or purplish colour; the leaves large, glossy, rather distant; the flowers large, semi-double, borne on long footstalks, and hence often presented drooping—an attitude favourable to their protection from wind and rain, though not desirable as regards their appearance. The colours vary from white to citron and rose pink, and the odour they emit may be likened to that of the finest sample of Tea newly opened; say for the sake of being precise, it is a sublime edition of first-rate orange scented pekoe.

As will be seen from the foregoing remarks, in England this family is looked upon as exceedingly delicate and requiring the greatest care and attention to ensure any degree of success. In this country, however, they seem to have found a home in every way congenial to them, and under intelligent cultivation never fail to reward our labours with their beautiful flowers in profusion. In the whole family of Tea Roses there is not a single variety that can be called a shy bloomer, much more any that fail to bloom entirely, as is so frequently the case among Hybrid Perpetuals.

The first important point in cultivating this group is the choice of a suitable position. The most favourable site is one that is entirely open to the east and south and partially shaded on the north and west; and the latter more especially so. One hour's sunshine in the early morning is more valuable to most plants than the whole of the rest of the day; on the contrary, western sunshine is frequently very prejudicial to plants, and for the following reasons: After a plant has been fully exposed to the morning and mid-day sun, its sap must of course attain to a high degree of heat; if this is continued till sunset, the plant has not regained its normal temperature before the chilly night air, which at some seasons sets in very quickly in the plains, falls with withering effect on the plants when quite unprepared to withstand its influence, being almost identical with checked perspiration in the human being, for we all know that plants live, breathe, even perspire through their foliage. On the other hand, where plants are shaded after mid-day, their temperature gradually sinks to the ordinary level, and they are then prepared to withstand the change which of course falls on them in a much smaller degree. One thing must be carefully noted, that the position selected should be well raised above the ordinary ground level, so that any excess of moisture may be carried off at once, as they are very impatient of anything like stagnation at the roots. "Landolicus," in his "Indian Amateur Gardener," gives the following advice regarding the formation of rose beds: "A soil for roses cannot well be made too rich. I would suggest that at a depth of about three to four feet, according to the sort of rose to be grown, a double layer of slates should be placed, drainage put down and the whole soil filled in, after being prepared with good stiff loam, cow dung and stable manure. By this means the whole earth will be good, and the roots would not go down deeper than the good soil, and this soil might be renewed."

Few of us would probably care to incur the extra expense needed to make up beds according to the above plan for Hybrid Perpetuals, or any other of the vigorous growing families of roses. We cannot, however, too strongly recommend it for Tea Roses, knowing from our own experience how soon they repay the additional outlay. We know a bed of Tea Roses that was made and planted long before the "Indian Amateur Gardener" was published, and differ somewhat from the plan given above in a few minor points, though having practically the same effect and has the additional advantage of cheapness. This consists of a piece

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of ground fifty feet square; all the old soil was removed to a depth of three and-a-half feet on the north and four feet on the south side, thus giving it a gradual slope; the bottom was then beaten down firmly, and on this three inches of old building rubbish was laid mixed with a small quantity of fresh lime to bind it together. This was again well beaten, and another inch of new kunker and lime added (at the rate of one part in three), was again beaten down, the whole, when finished, having the appearance of a pucca floor. This was allowed to dry for a fortnight, and a layer of coarse brick rubble or khoa, similar to what is used in the lower strata for road-making, was then added to the depth of ten inches. The soil, which had been previously prepared, was then filled in and pressed down firmly, and when finished off was about four inches on the sides and eight inches in the centre higher than the ordinary level. The soil was prepared as follows:—Two parts of the original soil (which was a good light loam that had grown first-rate vegetables for years), one part turfy loam, and one part old cow manure and half a ton of bone phosphates added to the whole, the bed was allowed to remain a month to permit of its settling down, and the plants were then put in three feet apart each way and treated liberally from the first with liquid manure and top dressings at intervals. This was completed in 1878, now more than seven years ago. The first season they were not pruned at all; in 1879, 1880 and 1881 they were pruned and manured in the ordinary way; in 1882, however, the plants had become too large and woody; all the old wood was then cut back to within three or four eyes of the main stem, leaving on each plant two, or at the most three, strong shoots of the previous season's growth; they were then heavily manured and a surface dressing of about three inches of old manure forked in over the entire bed, and this was supplemented by weekly dressings of liquid manure. By the end of the flowering season the plants were larger than ever, though of course the quantity of bloom had been materially reduced as compared with former years, as the vigorous succulent shoots they had thrown up so freely from the base produced but very few flowers, a matter of regret for the moment, though there was the consolation of knowing that the foundation for a grand crop the following season had been laid.

In October 1883, the plants were again pruned; this time all the old wood that had been left the previous year was cut back to within three or four eyes of the main stem; the new wood was simply shortened back to the first well ripened joints. Instead of opening the roots in the usual way to manure the plants, these were left intact, and trenches were cut between each row of plants about one foot wide, going quite down to the layer of brick rubble. These were allowed to remain open for a fortnight, and were then filled in with a compost of equal parts of old cow manure and fresh turfy loam with about five hundredweight of bone phosphates added to the whole.

The result exceeded even the most sanguine expectations; the flowers were not only borne in endless profusion, but were of grand size and quality—certainly the best we have ever seen anywhere in the neighbourhood of Calcutta, where, as most of us know to our cost, it is a very difficult thing to grow really good roses. It will be observed that by the plan of pruning and manuring adopted last season, there was obtained, so to speak, new plants on old established roots and in new soil. The wonderful profusion of bloom last season may be attributed to two causes: first, in cutting the trenches the plants were subject to a partial pruning of the roots, as the soil when cut through was found completely filled with fibrous roots, (root pruning, as we all know, increases the floriferous qualities of nearly every description of plants); second, after these trenches had been filled with the new soil, the roots, which had been cut in removing the old soil, would naturally break freely into it, thereby securing fresh food and nourishment for the plant, for it is on the fine fibrous roots, often wandering a long distance from the main stem, that the plant has to depend for its sustenance. This is a fact very difficult to instil into the minds of our native gardeners—aye, and many amateurs also who when removing plants think it is quite sufficient if they secure the main roots intact, ruthlessly sacrificing what they foolishly imagine to be unnecessary appendages, but which in reality are the life and soul of the plant. This accounts for so many plants succumbing to the operation of transplanting, and others, if they do survive, sometimes remain at a standstill for months, that is till new fibrous roots, or what we may term food-seekers, are formed. The Chinese gardeners have shown us to what extent root-pruning may be carried in stunting or dwarfing plants. The whole of the miniature plants raised by them being treated in this way, they have reduced this to such a science that even with shrubs that in their natural growth attain a height of twenty or twenty-five feet, they will produce perfect flowering specimens not more than six inches high, and it is even stated that one species of conifer or pine has been dwarfed to such an extent that a complete plant, several years old, can be used instead of a button-hole flower.

To return, however, to our subject, we ought to have mentioned that from the south side of the bed in question there are four subsoil drains placed at intervals of ten feet and on a level with the pucca bottom of the bed; these carry off all surplus moisture to a tank close by.

We can safely say that plants grown in this way will produce double, or even treble, the quantity of flowers and of much better quality than they will when grown in the ordinary way. Another advantage, in the rainy season, generally a very critical period not only for Tea but also many other families of roses, they will stand any quantity of water without flinching. We ought also to mention, on the other hand, that during dry or hot weather they require to be supplied with two or three times the amount of moisture that plants do when grown in ordinary soil. During the six years this bed has been in existence not more than twenty of the original plants have had to be replaced from any cause whatever—a wonderfully low death-rate averaging but a little more than one per cent per annum.

And now as to the question of cost. Herein lies the only stumbling block to the whole system, and before which all the increased health and vigour, all the enhanced quantity and quality of the flowers, will wither in the mind's eye of many a would-be enthusiast. The bed in question contains sixteen rows, each comprising sixteen plants, that is 256 plants in all, and it was estimated at the time that it cost a rupee for each rose planted in addition to their original value—undoubtedly a very large sum, but it has been repaid tenfold, if not in actual specie, at least by the grand measure of success it ensured.

It is a curious fact that, until within the past two or three years, with the exception of Devoniensis, which still maintains its position as one of the very finest roses, not a single seedling variety of this group had ever been raised in England, and this, as we believe, we mentioned in a previous article, was an accidental seedling found growing wild in a Devonshire garden. Another English raised variety is Letty Coles; this is, however, only a sport from Madame Willermoz, supposed to have resulted from inter or cross-budding. Some of the best roses in cultivation have been produced in this way. We will content ourselves by giving two or three well known popular varieties as examples. First, let us take Marechal Neil, which, it is said, originated in this way (although at the time it was first sent out it was described as a seedling variety): Buds of Cloth of Gold were inserted on the American rose, Isabella Gray, the result of the union being "The Rose of Roses." Then we have that grand rose, Mabel Morrison, the result of bud variation, caused by the inoculation of Baroness Rothschild and Niphetos; and, lastly, we have Belle Lyonnaise, the result of Gloire de Dijon being budded with Celine Forestier.

A curious instance of the influence that buds have on the stock occurred to us a few years since. A fine shoot of Xavier Olibo had been accidentally broken off, containing several eyes in prime condition for budding. We looked round in vain for suitable stocks, for every one had been worked previously. At last we espied an old favorite, Marechal Neil, that had thrown up a monster shoot that season. Without a second thought we headed it down to about four feet and inserted the whole of the eyes, seven or eight in number, at intervals of five or six inches along its entire length. Two of these broke almost at once, and made shoots about three feet in length the first season. It is not of these, however, that we have to speak but of the Marechal himself. To our astonishment, on the flowering season coming round, every bloom on the plant had each petal striped with deep crimson; this became intensified as the flowers matured, till, before withering, they were almost entirely of this colour. We felt we had gained

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a prize, indeed, and in all probability we had done so, but it was the old tale of the cat and the mouse over again, for we played with it till we lost it. Instead of propagating it at once, as we certainly ought to have done, we foolishly determined to leave it alone till the following season, so that this curious freak might be confirmed or otherwise. Dame Nature, however, decreed that we should be disappointed, for before the next season came round our poor Marechal had been laid low by that fell disease, *canker*, by which so many of his noble ancestors had been made to bite the dust, this disease in fact being almost exclusively confined to this noble rose.

We may mention that Marechal Neil is classed with Tea Roses by many authorities. Others again make a separate group termed "Tea Noisettes," in which they also include Cloth of Gold, Triomphe de Rennes, Celine Forestier, &c. The more general practice, however, is to class all these, including the Marechal, as *Noisettes*, and it is under this head that we hope in a future article to describe them. We will in our next endeavour to give a short description of the best varieties of Tea Roses, selecting the most distinct kinds, but of course in a group like this, where the range of colour is but limited, there will be found a certain amount of sameness in many varieties.

HORTICULTURE IN INDIA.

Celery.

I have seen Celery growing in many places in India, but seldom under the circumstances that it ought to be cultivated. I have also occasionally, though rarely, seen heads of it produced in the markets, but never in a state fit to be seen on any table. It may often be met with in sprigs, mixed up with parsley, curled cress, &c., and nearly all malees grow it in this way for flavouring soups. Nor are many of the native cooks aware, that it was ever intended for use otherwise. I once saw fine heads brought to table boiled. When cultivating it myself I have shown many malees how to plant and earth it up, but I have never known one who would continue to follow up my instructions, and those under me for years, could not, or would not, recollect from year to year how it was done, simple as it is. Under such circumstances I have felt it to be a hopeless task to induce malees to take any interest in this or any thing else, except his rice, bed, and a few other indigenous things. Unless amateurs, and those interested in gardening, take the matter up, and persistently and perseveringly see that instructions are carried out and the work properly done, all that may be said, written or shewn for the purpose, will be useless, and even this may become a task upon the time of amateurs, and a trouble that may wear out their patience ultimately. Gardens and gardening are not yet established as schools for the art of culture. The progress of ornamental gardens under the present system of management are not likely to give India improved malees in the art of gardening. The present state of things will, I fear, continue until amateurs spring up to take the matter in hand in this country, as they have done at home, where they long since took the lead and are ever likely to maintain it. It is to them that we may look forward to, and hope for encouragement and progress through private enterprise hereafter. I may allude to this subject more fully at some future time under another heading. I must now return to the one I commenced upon.

In England the earliest Celery, which is the white variety, is sown upon a spent hot bed under glass in March; a second early in April, and a third, the late or red variety, in May. In the hill stations this course may be followed, or a little later. In Northern and Central India, where the fall of rain does not exceed 35 or 40 inches, and a piece of ground somewhat elevated to drain any surface water away that may be liable to lodge in the trenches is available, the sowings may be made in April, May and June, grown on and planted in the rains. From the earliest of which heads may be ready by the end of September or October. In Southern India, and those parts where the rains are excessive, the sowings may be best if made during the rains, in pans, pots, or shallow boxes under protection, and receive their final transplanting immediately after or at the end of the rains. As the seed is very small it must be covered with finely sifted earth and afterwards covered or kept in a dark place until it has vegetated, when it may be exposed to a subdued light, when large enough it must be transplanted two or three inches apart. Where the quantity required is small, boxes may be convenient; they are handy for moving about, or small beds may be prepared, not sunken, but raised slightly above the level of the ground, and a few bamboos arranged for shading them. A second transplanting will also be necessary in this way, to six inches apart, before the final transplanting into trenches takes place, for the plants must not be puny things for trench planting. In England Celery plants grow very slowly at this stage for want of heat or warmth; this is not the case in India. Shading in the early stages of growth is required, and raised beds, with sunken walks in the rains for surface drainage, also to prevent being flooded; stagnant water upon the plants will kill them, or injure the heart and prevent the after growth of it. At home all transplanting is done in lines to facilitate the work in various ways. In this instance, as the seed is fine, the plants come up small and thickly; transplanting twice is necessary before the final transplanting into trenches. If the line system is adopted, —say at three inches apart in the first instance—in the second, every alternate line may be removed, without disturbing the remainder, until they again become too thick, when the alternate plants left may in like manner be removed, and I have found that the second transplanting of these has not had too much room allowed them, at twelve inches apart from line to line and six inches from plant to plant in the lines. Hoeing and cleaning is admissible, and facilitates growth. The plants grow rapidly in the rains on high ground, where they cannot get swamped, and by the end of the rains make fine plants for the trench system. The soil must be rich, it cannot be too much so, provided the manure is thoroughly decomposed and the garden soil friable and mellow.

We now come to the final transplanting. There are two ways adopted, each has its pros. and cons. which requires some explanation. One is termed the bed system or above ground. The other the trench system, in or below it. The first is applicable for swampy situations, therefore a desideratum in India during the rainy season. Its drawbacks are the difficulty of applying water to the roots should it be required, and finding earth or other material for earthing up with, and the extra labour of bringing it. The second may be swamped at any time by heavy rains. This is not liable to happen in India after the rains are over. Carelessness in irrigation where water is plentiful, or if a heavy head should be on, from a canal, may however happen; this last objection being under control may be nullified. Each has its merits for India, and may be adopted. I have found both useful in the plains and in the hills, where want of space has been a consideration in favour of the bed. The ground must be prepared by manuring and digging, which ought to be done at some favourable opportunity; the former before the rains set in, the latter during a break, or immediately after the rains are over. If the land for the bed has not been trenched or dug two feet deep previously, it should be done. The desirable width of the bed may be from three to six feet, but not wider, and of any length required; the plants may be fifteen or eighteen inches apart from line to line, and six to eight in the rows. When the plants in the nursery beds commence to throw up strong and somewhat erect stems, and are a foot or nearly so high, it is time to transplant them in their final sites. Remove the small leaves from the bottom of the plants. Lift the plants with a fork, save all the fibrous roots and as much soil as will adhere to them. Do not handle the roots in planting; make the plants firm by treading slightly. When the plants have made vigorous growth by throwing up new strong leaves with stout stalks, it will be the time to commence the earthing up. It is not well to be in too much haste before the plants are fit for it; first remove any short flat leaves that may have been allowed to remain when planting; and if you have any newly slaked lime and fresh soot, give the plants a dusting with it; do not be too heavy handed, but dust the stems and butts of the plants evenly, and the ground about them freely, to prevent worms, slugs, grubs, &c., taking up their quarters, or they may soon do an immense amount of damage, for they are very fond of Celery. We now come to the time when the

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error in culture is so frequently made by the uninitiated amateur or careless malee. An expert will, after clearing away the bottom leaves, gather up the remainder and adjust the outer stalks to form an envelope to protect the inner ones, and the heart of the plant, *so that no soil may make its way into the interior*, by grasping the whole in his left hand and compressing it tightly, whilst with his right hand he places the soil round the plant, at the same time making it firm, to the height required; on each occasion that the earthing up is performed afterwards, he will carefully repeat this process until the height determined upon is attained. In this way only can a good clean head of Celery be successfully grown. I would advise any tyro, at first, to tie up the plants with strips of plantain rind, somewhat tightly, using two or three ties, and when placing the earth and firming it round the plant to use his left to compress the stalks together in case they may not be tightly tied or properly adjusted, he must however cut the ties as he earths up to them, or the ties may cut the plants and disfigure them. This is the way pupils are taught to do this work at first, but they soon abandon the tieing when they get used to it by the hand. In this way Celery is grown to perfection in lengths, varying from one to three feet; the former in beds, the latter in trenches.

Planting and digging is always performed at one operation at home, more especially in our nurseries. We have our work before us, and make progress backwards, therefore have no need to walk over our work. The native, on the contrary, in digging makes progress forwards, walking over his work, which is thereby trodden; planting at this operation and way of digging is impossible.

In preparing the trenches the ground is first marked off in two feet widths, one for the trench, and the next for the ridge, alternately throughout, which constitutes ridge and furrow: the one is dug to the depth of eighteen inches and the other is raised proportionately. The bottom of the trench is made as wide as the space and nature of the soil will admit; three or four inches of thoroughly decomposed manure is placed in the bottom of the trench, dug in and mixed with the soil, which is done by a digging fork or spade. If the planting can be done at the same time as the digging, it will save time as well as trampling the newly dug soil in the trench. When watering, do not pour it into the hearts of the plants, but at the sides in the trench. In earthing up observe the instructions before given, don't forget the lime and soot. If soot is not available use sifted wood ashes mixed with the lime.

EXPERT.

POTTING AND PLANTING.

It would scarcely be possible to name any part of the Gardener's duties that, as a rule, are so generally mismanaged by the indolent class of natives whom we are compelled to employ, as the operations above mentioned—that is when the management of a Garden is left entirely in their hands. Even under the most careful supervision it is almost impossible to induce them to carry out their work by any intelligent system. With the majority of them hard-wooded, soft-wooded, or succulent plants, Ferns, and we might almost include Orchids, are, according to their ideas, all members of one family, and as such should be treated all in the same manner, and that is, simply to give them a certain quantity of soil (no matter of what nature), supply water at intervals; and after that the existence of the plant is entirely in the hands of Providence. The following interesting remarks on the importance of these operations, from the pages of one of our English contemporaries, will probably prove of much practical value to those of our readers who personally superintend their gardens, or who have the patience, or rather the determination, to compel their mâlees to carry out the instructions given them:—

It would be hardly possible to over-estimate the importance of these two operations. It is, in fact, almost useless to study the requirements of the many varied forms of vegetable life in respect to light, air, moisture, &c., if the conditions necessary to a healthy and vigorous root-action do not receive due consideration. The advantage of a good start in life to a young plant is fully recognised by practical men. A Vine or fruit tree, for instance, will generally indicate, by its first year's growth, the degree of perfection at which it may eventually arrive. In the case of soft-wooded, quick-growing plants, the effects of judicious management in this respect will manifest themselves even more strikingly. That which retards or diminishes growth in any way must necessarily detract from the general health and vigour, and affect the future welfare and progress of the subject. It is, therefore, evident that too much care can hardly be bestowed upon all operations by which the action of the root is affected. The skilful, intelligent cultivator endeavours to preserve his plants from checks of all descriptions. He guards against extreme vicissitudes of temperature, moisture, &c., and he knows full well the vital importance of preserving, in their normal state of health, those organs which draw from the soil the requisite daily amount of nutriment. If the root receive any injury, the whole plant immediately feels it, and suffers in proportion to the damage inflicted. Notwithstanding, however, that these facts are well known to, and acknowledged by, the gardening world in general, there still remains a lack of due appreciation of their importance, as is often evidenced by the want of care and reflection exercised in the details of planting and potting. A few well-grown subjects reflect more credit on the possessor than a large collection of badly-managed ones. Whether plants be grown for pleasure or profit, for the production of bloom or fruit, the effects of attention to a few details, which the inexperienced might regard as unimportant, will be amply rewarded. That which induces a great deal of this work to be performed in a hasty, haphazard manner, is the fact of employers oftentimes being too apt to judge of the skill and application of the workman by the amount of work got through in a day. In this respect there is, of course, a vast amount of difference between men. Some will always excel, not only in quickness of manipulation, but, at the same time, will exhibit a greater amount of care in their operations than others. There are, however, few who can combine great speed with perfection of workmanship: and, as a rule, young men should not be encouraged to aim at arriving at this point, as it is calculated to induce a hasty, superficial manner of getting through their work. In removing a tree, or re-potting a plant, we are in a manner constrained to violate the laws of Nature—we mutilate the root and check its powers for a time; but the ill-effects which, more or less, this derangement causes, may be reduced to a minimum by adopting proper precautions.

The condition and quality of the soil used must, of necessity, hold the first place in our consideration; it is, however, rather to its preparation than to its innate qualities that I would direct attention. To the cultivator the soil-yard may be said to form the basis of nearly all his proceedings; and no pains should be spared to keep up a supply of the several kinds of mould that may be considered necessary, a portion of which should always be in a fit condition for immediate use. It is not always easy to obtain the exact kinds of soil that one would like—locality and various other circumstances often influencing the supply; but, with a little management, we may always contrive to render ourselves tolerably independent in this respect. I was once placed in peculiarly unfavourable circumstances in regard to the necessary compost; I could not procure a particle of good loam, the peat was of the most wretched description, and white sand was unknown. There was, however, an immense accumulation of very old leaf-mould and manure; the collection of plants was varied, but I had fair success with them, which I attribute to having every particle of soil thoroughly dried and exposed to frost before using it. Palms, stove plants in general, and many Ferns, grew admirably in it; in fact, the free root-action and corresponding luxuriant growth of many plants, for which I had always considered the best fibry peat and silver sand indispensable adjuncts, quite surprised me: Gloxinias and Achimenes succeeded remarkably well thus treated. I may here just observe that the best-cultivated collection of Gloxinias I ever saw was potted in thoroughly decomposed manure with no other admixture. I would, therefore, suggest that all soils should have careful preparation for use, more, I believe, depending upon this than upon the richness or natural suitability of the earth itself. Leaf-mould should be several years old—in fact, the older the better; and manure should never be employed unless three or four years old, and it should be well turned over as often as convenient during that time—every portion being exposed to sun, air, and frost—a strict observance of this injunction being absolute-

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ly necessary. When fit for use, it should be reduced to, and undistinguishable from, mould itself. There is, in my opinion, no greater evil than using manure in a lumpy state for potting, especially in conjunction with raw, unctuous loam. Great care must be exercised in watering, or the fibre is apt to perish, and the soil become sour, when all mechanical assistance is lost. Loam should be stacked some considerable time before being used; it cannot, of course, be turned about as in the case of leaf-mould, &c., but a portion should be well chopped and undergo a purifying process; if required in a rough state, each lump should be subjected to the sweetening action of the atmosphere. Peat should receive a similar preparation. A portion of each kind of soil employed for potting should always be kept under cover with the view of having it in good condition for use at all times when required, also that its temperature should correspond in some measure with that of the soil in which the plants are growing.

Advantage is often taken of rainy days to get through the potting work, and nothing is worse than the employment of soil in a wets, odden state. Mould for potting should be employed in a moist, but not wet, condition; if on compressing a handful, it does not open again freely in the hand, it is too wet; at the same time it should contain enough moisture to obviate the necessity for immediate watering. Fibres seem to be produced more readily when the earth is in a semi-moist state. If one can, in the case of newly-shifted plants, dispense with the watering-pot for twenty-four to forty-eight hours, the displaced rootlets will, in that time, strike afresh into the new soils; or oftentimes a fresh lot of young roots will, in that short space of time, be produced. The use of dry soil necessitates a heavy watering; the check and excess of moisture often cause the delicate spongioles of the fibres to decay, and a certain period must elapse before these can be replaced; the plant in the meantime suffers, or, at the least, receives such a check that it takes some time to recover. If the pots and drainage be quite dry, they should be sprinkled; in the case of new pots, it is advisable to soak them before they are drained. The inside of the pots and the crocks should be of the same degree of moisture as the compost to be used, otherwise the lower portion of the soil becomes so dry that heavy waterings are needful to moisten it properly throughout; at the same time, the interior of the pots should never be in a wet sloppy state when used, as this will cause portions of the mould to adhere to the sides, and in the next shift much valuable root will be torn away. For this reason, too, it is indispensable that all old mould should be cleared from the inside of the pots. Nothing should be shifted or planted with the ball in a dry state. Plants intended to be shifted should be well soaked some time beforehand —if in the winter time, some twelve hours before being operated on; but in dry summer weather, two or three hours will suffice to drain the superfluous moisture. In the case of a plant that may have become pot-bound, or in any way hard in the ball, it is advisible to pierce the same with a sharp skewer, and, in placing it in the fresh pot, to allow the soil to slope a little from the edge towards the stem, forming a kind of basin around it; the water will then go where it is most required. This will also apply to planting out-of-doors, especially in the case of shrubs grown in peat, which are often lost in the moving, through the water not being able to permeate the old soil. In potting off cuttings of all descriptions, the roots should never be in a dry state when placed in the fresh soil. In planting in the open ground, much time and labour may be economised by a little extra care in this matter; transplanting may be done as well in hot weather as at any other time, and in the case of many plants, with greater assurance of success.

Strong seedlings or cuttings that have to be transplanted in dry weather should be watered twelve hours before being moved; if then taken up and immediately placed where the air cannot dry the roots, they will immediately lay hold of the ground, and one or two gentle waterings will generally be sufficient to ensure their growth. I have found nothing better for transporting young plants in when at this work than a common pail; it is impervious to the external atmosphere, and if covered with a damp cloth will preserve them fresh for hours. This is a great advantage, as a sudden call may often be made upon men, necessitating their absence for some time. Cuttings should never be allowed to become pot-bound; the stunted growth and the loss of roots which the forcible separation of the plants occasion render them liable to the attack of many insect enemies.

WORK IN SEASON.

THE VEGETABLE GARDEN.

Every part of the kitchen garden should now be kept in a neat and well regulated condition; and constant attention should be paid to the progress of all seeds committed to the ground. Those that vegetate freely should be forwarded by hoeing, thinning and watering; and in those cases where the seeds have failed, they should be immediately re-sown; no time should be lost when such circumstances occur. Some crops, such as Beet, Turnips, Onion and a few others, may be restored by transplanting them from those places where they have come up too thickly. The depredations of insects should be guarded against as much as possible until the crops are well advanced; for, after they have formed their rough or perfect leaves, few insects attack them, at least not so as to endanger the crop. When recourse is had to watering, it should be applied as late in the afternoon as possible, or early in the morning, but never during the middle of the day. In a vegetable garden the main object should be to produce a regular daily supply throughout the season, —never to be short, never to have a great deal more than is wanted for use in good condition; to secure this sowings of all the leading kinds must be made at regular intervals.

Carrots may now be sown, and those who know the sweetness and delicacy of the short horn kinds, will take care to have a supply of them. These may be sown broad cast on beds and thinned out to three or four inches apart, as these sorts do not require much room; the long varieties are best sown in drills. If it is preferred to drill the seed in, let the drills be one foot apart, as shallow as possible, and sow the seed continuously along the drill, or three or four seeds at intervals of six or eight inches: this economises the seed and admits of going among the plants without treading on them. Light ground should be trodden before it is drilled: the seed hangs together, and should be separated by rubbing it up with soil if sown broad cast; but this is unnecessary if sown in drills. The seed is very light, so that a calm day should be chosen for sowing, a little wind is apt to blow it any where except in the right place: it takes from ten to twelve days to germinate. As soon as it is well above ground use the hoe unsparingly and thin out to not less than six inches apart.

Lettuces should be sown for succession; the large Drumhead or Malta, does well sown at this time; but Cos lettuces are generally preferred as being most crisp, but any sort will do well when sown at this season.

French Beans.—These may now be sown plentifully; they will be found exceedingly useful, as they follow the main crops of Peas. Sow in drills three inches deep and three feet apart. Earth up those which have made a pair of rough leaves after thinning to six inches apart. They should have no manure, as that is likely to make them run all to haulm.

Runner Beans should also be sown this month; being of a climbing habit and very quick growth, they must have plenty of room; they do best when placed in rows 10 or 12 feet apart with some other dwarf crop between them.

Onions.—The main crop of Onions should be got in at once; consolidate the ground by rolling or beating firmly and sow in drills from 7 to 10 inches apart according to the size of the variety.

Peas.—Make successional sowings of the wrinkled varieties at intervals of a week or ten days, and let the ground for them be well manured and deeply trenched. Earth up advancing crops as soon as they are three or four inches high.

Cabbages, Cauliflowers, Brussels Sprouts, Savoys, Broccoli and Knol Kohl.—If the main crop of these is not already planted out, no time should now be lost in getting them in their places. Take care that the soil is in a proper condition to receive them, for although

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these members of the Brassica tribe may be considered the hardiest vegetables in our climate, still they have a very decided objection to a water-logged soil, and will never root freely in it; it is far better to wait a few days in unfavourable weather than to run the risk of losing all our plants by planting under such conditions. Advancing crops of these should be carefully looked over, and see if any are eaten by vermin. Replace any plants that may have been destroyed, and draw earth up to the stems. As the plants increase in growth a dusting of lime given early in the morning, when the plants and soil are wet with dew, this will destroy slugs.

Thin out all advancing crops of Turnips, Carrots, Beet, Lettuces, &c., as soon as they are large enough to handle, and do not neglect to keep the surface constantly stirred, not only to destroy weeds but for the welfare of the crops.

Keep up successional sowings of Radishes, Turnips, Spinach, Cress, Mustard and other fast-growing crops.

THE FLOWER GARDEN.

ORCHIDS.—The majority of Orchids will now require to be rested, to ensure the proper ripening of the season's growth. Deciduous species should be placed in a cool dry situation and water entirely withheld; this, however, should be done gradually. Æerides, Saccolabiums, Phalænopsis, and similar species require different treatment; they should never be allowed to become entirely dry, but water sufficient to keep the foliage firm, plump and healthy—and no more—must be supplied them regularly. Do not attempt to keep them growing on; this is a mistake that is frequently made by amateur gardeners unacquainted with this genera, and which if persevered in effectually prevents the plants blooming the following season.

CHRYSANTHEMUMS may be lifted and potted at once, and others may be moved to fill gaps in the flower garden. If well watered three days previous to moving, lifted with balls of earth, and well watered afterwards, they will scarcely know or show their moving, especially if they are syringed once or twice daily till well established.

ROSES.—The general pruning of Roses should be put in hand at once. For full instructions regarding this operation we beg to refer our readers to page 239, vol. I.

CAMELLIAS in pots should now be swelling their buds, and must not be allowed to want for water; care, however, must be taken not to supply it too freely, otherwise the buds are liable to drop off. An occasional dose of weak liquid manure will also be found very beneficial to the development of the buds. Bulbous plants that require rest must have less water given them, and be removed to a cool dry place.

A general sowing of Annuals may now be made. If the beds or borders are ready. Seedlings of Dianthus, Phlox Drummondi, Antirrhinums and other Annuals that have been raised in pots, should be ready for planting out by the end of the month. Choose dull days for the operation, and water through a fine rose to settle the earth about the roots. In all such watering, and especially in the case of plants at all tender, it is well to water at the roots before all the soil is replaced, so as to have the surface loose and as dry as possible. For similar reasons, preventing loss by evaporation, &c., it is advisable not to plant such things on a wet day or when the ground is wet, as then it takes great trouble to get the trampled ground sweet and friable again.

To grow Annuals successfully, great care is required in the proper preparation of the beds. If we have naturally a good light soil, a liberal dressing of leaf mould and old cow manure will be sufficient; if, however, it is of a heavy retentive nature, we should remove it to a depth of at least eighteen inches, replacing it by a compost of two parts good light fibrous loam, one part leaf mould, and one part cow manure. The manure and leaf mould used in growing Annuals should be at least two to three years old, as, unless it is thoroughly decomposed, it invariably does more harm than good.

Attend particularly to the destruction of weeds and insects, to the neatness of the borders, and tieing up all plants requiring support, to the finished appearance of edgings of all sorts, to the pruning away any luxuriant growth of shrub or flower, to keep grass well mown and roads well rolled; all of which, simple and obvious as they are, yet constitute the minutiæ of enjoyable gardening,

LONDON OFFICE

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THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

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Correspondence.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to, should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

VIOLET CULTURE.

Locality and soil have undoubtedly much to do with the success obtainable in the culture of Violets, for in one place they may flourish, while in another

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they require skill and much coaxing to bring them to anything like perfection. One thing, however, is certain, viz., that growing violets in crowded beds, where the crowns get but little light and air, is not likely to favour the production of flowers. See how violets grow naturally, and you will gain a pretty correct knowledge of what they, in one point at least, require. Nature has given them the means of avoiding overcrowding, and of insuring to each plant a position favourable to its welfare. By means of the creeping stem, the young plant which is commencing life on its own account is removed far enough away from its fellows to admit of the enjoyment of a plenteous amount of light, air, and even sunshine, and seedlings continually springing up provide against deterioration of constitutional vigour. This leads one to think that violets might be very easily grown from seed, and that, where the usual means of cultivating them is not satisfactory, this method of doing so might be worthy of attention. Everyone knows how primroses and some other hardy flowers may be grown in much perfection on soils not naturally favourable to them, when a practice is made of raising them from seed every year or so. Why, then, should we not grow violets in the same way? For all I know, they may be thus grown, but I never remember to have seen the practice recommended. One objection to it is, that the kinds would not come quite true, but I believe that violets are less liable to sport than many things; and even if they did, it would not in a general way matter much, and there would always be a chance of getting something new.

A certain amount of shade from the hot summer sun would seem to constitute an element of success in violet culture. At the same time, violets thrive very well in certain places grown as a field crop, and in the full blaze of the sun. This is, however, only where the soil is naturally favourable, being, generally speaking, a loam of a somewhat holding but otherwise free nature. The greater amount of fresh pure air, too, enjoyed in an open field tempers the heat of the sun and robs it of its debilitating effect. The violet often pines and dies in small gardens, because the atmosphere becomes overheated and deprived of its life-giving properties. It is, therefore, advisable in such places to select a position screened from the midday sun. Having my choice, I would prefer a border where the sun came until about twelve or one o' clock, as in July and August, which are the most trying months for violets, the most drying time of the day is during the early hours of the afternoon. Thus placed, and watered overhead about four o'clock, the plants are, in a great measure, guarded against the exhausting effects of a fierce sun and an arid atmosphere. The north sides of trees or of a building are often recommended as the most suitable position for violets, and in the southern countries they are probably very favourable places, as in warm districts and on light soils red spider is so difficult to grapple with in hot summer, when the plants are in the fierce sun throughout the day. In a north aspect, on the contrary, it is seldom troublesome. As a rule, however, I should be inclined to depend upon a deep root run in well stirred and enriched ground, in conjunction with a mulch of rotten manure and copious waterings and frequent sprinklings overhead to keep the insect at bay. If it does attack very vigorous plants, it rarely becomes their master. It is only debilitated specimens that are ruined by its ravages. Certainly in the northern districts of this country I would not preferably make violet plantations in a north aspect, but rather where the sun comes during the greater portion of the day.

There are two ways of making new violet plantations. Either the old plants may be divided after flowering, or the young runners can be taken when they have become fairly well rooted. Where the plants have not become crowded, and there is sufficient space for the plants to form nice balls of fibres before removal, they will, if carefully transplanted, scarcely miss their moving, and, if well attended to, will grow into large specimens by late autumn. If, however, they are likely to be crowded, it is better to cut them off and dibble them in fine soil in a shady position, keeping the soil moist until they are well enough rooted to go into their permanent quarters. Old plants should be divided and set out in rows 1 ft. apart and 6 in. from plant to plant as soon as the blooming time is over, then they make good sized specimens full of buds by autumn. When grown in frames they should be placed there early in October, so as to get good root-hold by winter. Violets in pots are very acceptable for the window and greenhouse; only a few flowers will fill a good sized room with delicious fragrance.—*Field.*

FRUIT GROWING IN CALIFORNIA.

The sudden development of this coast as a great fruit-producing region is so surprising even to those in its midst, and will probably in the near future so affect the world's markets, that some facts concerning it cannot fail to interest your readers. When the Americans first came to California they found little wild fruit and no orchards, except those planted by the Spanish padres around all the old Missions. These orchards consisted chiefly of seedling Apples and Pears, of Olives and Figs, with usually a Vineyard of a sweet blue Grape known since as the Mission Grape. When the mining excitement of 1849 began, the inferior fruit from these old Mission orchards brought such enormous prices, from 25 cents to 50 cents being often paid for one Apple, that great efforts were made to plant young orchards. Fruit trees, costing from 4 to 5 dollars in the nursery, were brought from Oregon as early as 1851, and often carried on muleback for hundreds of miles over mountain trails to little mining camps. The first trees which came into bearing netted large sums, Peaches being sold for 1 dollar apiece, and Plums for 25 cents. In one instance, a small orchard consisting of three-year-old trees was condemned for mining purposes, and a jury of miners appraised the trees at 100 dollars apiece. Nurseries were soon started at various points near the Bay of San Francisco, and tree planting went on with vigour. In 1855 or 1856 some of the mining camps began to decline, and the mountainous portion of the State was comparatively deserted. By 1860 fruit had so greatly declined in value, that old and formerly valuable orchards in the mining countries were totally neglected and left to run wild. Lack of transportation and an overcrowded home market were the chief causes of this neglect. Here was a remarkable state of affairs, which few were able to realise. This State, settled by pioneers in 1849, had actually, in less than a dozen years, become overstocked with orchards, so as to pass the limits of home consumption, and yet the great thermal fruit belt, adapted to Oranges, Grapes, &c., and extending for a length of 400 miles, with an average width of 30 miles, had only an orchard here and there, whilst a vast acreage of higher lands, fit for hardier fruits, was untouched and unclaimed. To many the limit of orchard planting had been passed, and in some cases young orchards were foolishly cut down. From 1860 to 1870 some railroads were built, which lessened the cost of transportation; fruit driers and canneries were established, and enough was done to convince people that dried and canned fruits would soon become a leading industry. Successful shipments were also made to the Eastern States, and have rapidly increased each year since. The planting of orchards began once more, and has gone on steadily. The old mining counties of Eldorado, Placer, Nevada, and others came to the front as fruit-producing counties, and will probably so remain. Since 1870 the fruit interests have yearly become greater. New varieties of fruit, patent driers, Apple parers, and labour-saving devices have occupied the public mind. There are a great many accidental seedlings, some of much promise. Our best autumn and winter Apples are White Winter Pearmain, Rhode Island Greening, Baldwin, Spitzenberg, Yellow Bellefleur, and Newtown Pippin. These average in price about 1 cent per lb. The trees are healthy, and yield enormously, so that they are profitable even at that price.

Clingstone Peaches are now considered better than Freestone for canning, and immense quantities are used. Late Peaches, also, and Apricots are greatly in demand. Only a few varieties of Plum, such as Coe's Golden Drop and Washington, are planted for drying, but Petite Prune d'Agen and Fellemberg are favourites. Of Pears, Bartlett, Winter Nelis, and Easter Beurré are the only ones worth shipping eastward. Cherries have never been too abundant, but the price for them is each year becoming lower, reaching 6 cents and 8 cents per lb. last season. Small fruits are wonderfully prolific, and we can have Strawberries grown in the open air every month in the year.

Dried Figs and Raisins are every year of better quality. Many failures were made at first, but now our best Raisins, dried by the Blower's process, are perfect in colour and flavour, and outsell Malagas in San Francisco. There is hardly any limit to our possible Raisin produce, and it is becoming a great industry. Dried Figs equal to the Smyrnas have never yet, to my knowledge, been produced on this coast, but tons of a second quality are made.

We have discovered within a few years that the Orange and other members of the Citrus family well thrive over more than three-fourths of

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the State, and in this direction also much interest is shown. The Dwarf Banana (Musa Cavendishi), of Florida, fruits here, and may already be seen in large fields; the Guava succeeds south of San Francisco; we are venturing, not without hopes, to raise Coffee; and our latest fruit is the Japanese Persimmon, or Diospyros Kaki, of which some 40,000 trees have, within two seasons, been disseminated, and some of the earlier importations are in bearing. The present prospect is in the highest degree encouraging for nurserymen, orchardists, and consumers. After our present Wheat era is done, our greatest wealth will remain in our Vines and trees. Indeed, our country fairs are already chiefly pomological displays, and exhibits of fine stock, rather than of grains or minerals. The variety of these displays is another marvel, eighty or ninety kinds of apples often being exhibited, and sixty of Grapes. Our only enemies as yet have been the woolly aphis on Apple trees, and mildew on Grapes near the sea-coast, with an occasional borer; but none of these have been troublesome. An orchard here will come into full bearing in five years. Peaches often bear the third year from the bud.—*American Gardeners' Monthly.*

NITRATE OF SODA AS MANURE.

The committee of the Saltpetre Producers' Association on the West Coast of South America (Comité Salitrero, at Iquique, Chili) offers £1,000 in prizes for essays on the use of nitrate of soda as manure. Of this amount—

I. A prize of £500 will be awarded for the best popular essay, showing the importance of nitrate of soda as a manure, and the best mode of its employment.

The essay, in its theoretical part, is to treat of the effect of nitrate of soda on vegetation, as compared with other manures containing nitrogen, and should exhibit the present state of knowledge on this point. In its practical part the essay is to give directions for the use of nitrate of soda in the various conditions of plant culture. References and quotations, and purely scientific explanations, if necessary, are to appear as notes. The essay may be written in English, German (italic characters), or French. The writing must be distinct, and on one side of the paper only. It is desired that the length of the essay may not exceed six sheets of printed octavo. Each manuscript is to be signed with a motto; the name and address of the author is to be given in a sealed envelope bearing the motto outside. The essays are to be sent on or before October 1, 1886, to any of the undermentioned judges.

II. A prize of £500 will be awarded for the best essay treating of the same subjects on the basis of new experimental researches made by the author himself. The essays must fulfil the conditions already mentioned. They may be sent to any of the judges on or before January 1, 1887. The committee of judges consists of the following agricultural chemists:—

Germany.—Professor Paul Wagner, Director of the Agricultural Station at Darmstadt.

England.—H. Warington, Esq., Agricultural Laboratory, Rothamstead, St. Albans, Herts.

United States of America.—Vacant.

France.—Professor L. Grandeau, Director of the Agricultural Station, and Dean of the Faculty of Natural Philosophy at Nancy.

Belgium.—Professor Petermann, Director of the Royal Agricultural Station at Gembloux.

Holland.—Professor Adolf Mayer, Director of the Agricultural Station of the State at Wegeningen.

Russia.—Professor L. Thoms, Director of the Agricultural Station at the Polytechnical Institution at Riga

If none of the essays received should thoroughly satisfy the committee of judges, they are authorised to award inferior prizes of not less than £150 each. Any essay for which a prize is awarded becomes the absolute property of the Saltpetre Producers' Association at Iquique, which also reserves to itself the right of translation into other languages. (Signed) Professor Paul Wagner, Darmstadt, for the Comité Salitrero, at Iquique.—*Gardeners' Chronicle.*

VEGETABLE CULTURE IN BERMUDA.

Consul Allen says that onions, potatoes, and tomatoes comprise almost the entire production of Bermuda, and give employment to the greater portion of the inhabitants, and the prosperity of the colony depends largely upon the success of the crop and the demands of the markets. In onion growing the seed used is grown in the Canary Islands, and is imported in the months of August and September; it is sown in the months of September, October, and November, thickly in beds, the ground having been heavily manured with stable manure two or three months before sowing. The white seed is sown first and produces the earliest crop, the shipment of which commences in March. When the plants are sufficiently large—about 6 to 8 inches high—they are transplanted into beds about 4 feet wide, the plants being set about 7 inches apart each way. The plants from the white seed are transplanted as soon as they are large enough, but those from the red seed are not usually transplanted until the beginning of January, and the ground requires to be only moderately manured. If transplanted too early, and the soil is too rich, the bulb is likely to split into several pieces and is worthless. After transplanting, the soil requires to be lightened once or twice, and the weeds removed before they mature. As soon as the top begins to fall, the onions are pulled and allowed to lie on the ground two or three days, when they are cut and packed in boxes of fifty pounds each and sent to market. All the onions are delivered at the port of shipment in boxes, ready for the market, and for the past two years the producer has been compelled by law to place his name or initials conspicuously on each package. It is estimated that a large profit on the outlay is realized. When the crop is large and the market good, an acre of ground sometimes returning as much as £120 to £170. For the cultivation of potatoes the seed was formerly nearly all imported from the United States, but of late years has come largely from New Brunswick, Nova Scotia, and Prince Edward's Island. The ground for potatoes is usually ploughed or broken up with the spade and raked, the seed cut into pieces with one or two eyes, and planted by forcing into the ground with the fingers to the depth of about four inches, in rows about twenty inches apart, and about eight inches in the rows. From six to eight barrels of seed are used to the acre. When the plants are a little above the ground, the soil is lightened between the rows with a fork, and when about six inches high the earth from between the rows is hoed round the plants, only one hoeing being required. For growing tomatoes the seed is imported every year, and is sown about October, and transplanted in December, into rows about six feet apart, and the plants are put about four feet apart in the rows. As soon as transplanted, the ground round the plants is covered thickly with brush—chiefly the wild sage which grows over the hills—not only to protect from the wind, but to keep the fruit from the ground. The brush is usually raised once by running a stick under and lifting it enough to clear the soil of weeds, no other cultivation being required. Six or seven quarts of fruit from the hill is considered a fair crop. The fruit is rolled in paper and packed in boxes containing about seven quarts each. Consul Allen says that the price of land in Bermuda varies from £30 to £40 an acre, and in some cases not more than one-eighth is susceptible of cultivation. It is estimated that there is an annual export of 350,000 boxes of onions, the box containing about 50lb., and of potatoes 45,000 barrels.—*Journal of the Society of Arts.*

A NEW METHOD OF PROPAGATING PLANTS.

Our correspondent, Mr. Peter Henderson, fully describes in the "American Agriculturist" a new and very successful method of propagating Geraniums and many other plants, which is an improvement made by him on an earlier process known as "layering in the air." This consisted in tonguing the shoot to be used as a cutting half through with a knife, as in the ordinary layering; the shoot so treated formed granulations, or "callus", on the cut surface, and was in a condition to form roots immediately on being detached and put into the earth. In the new process, instead of tonguing the shoot to be used for a cutting, it is merely snapped short off, at a point where the condition of the shoot or slip will make it hang on to the plant by the merest shred of

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bark. Slight as this strip of bark appears to be, it is sufficient to sustain the cutting, without any material injury from wilting, until it forms the "callus," or granulated condition, which usually precedes the formation of roots. The cutting or slip may be detached in from eight to twelve days after it has been broken in the manner described, and then potted in 2-in. or 3-in. pots. If watered and shaded rather less than required by ordinary cuttings, it will form roots in eight or twelve days more, and not one in a hundred will fail, even of plants of the Tricolor Geraniums, which are difficult to root under the ordinary modes of propagation, particularly in hot weather. Of the success of this method, and the classes of plants to which it is applicable, Mr. Henderson says:—We last autumn propagated in this way nearly 10,000 plants of the Tricolor class, with a loss of 1 per cent.; had we adopted the ordinary method, even with the plants in good condition, our experience has been that a loss of at least 50 per cent. might have been expected. This plan is applicable to many other plants as well as Geraniums; we are now using it with excellent success on the new double Poinsettia. The following plants may be also propagated with great certainty by this method, using the young, unripened shoots:—Abutilons, Begonias, Carnations, Crotons, Cactus of all kinds, Heliotropes, Lantanas, Oleanders, Petunias(double), Pelargoniums or Geraniums of all kinds, together with nearly all plants of a half woody or succulent character. Besides the absolute certainty of having the cutting root by this method, it has another most important advantage. All propagators know that many kinds of plants, when cut back for cuttings, become weakened so much that if not carefully handled they may die; also that if two or three crops of cuttings are taken off as they grow, the "stock plant" becomes permanently injured. By this method of breaking the slip, so that it hangs by a shred to the parent plant, the roots have to use their functions for its support nearly the same as if it remained entirely attached to the plants. This results exactly as we wish, in causing the parent plant to strike out shoots below the broken slip, and these again in their turn can be so treated. This process will be useful not only to florists but to amateurs, as it is both easy and sure, and we have no doubt that many of our readers will be interested in trying it.—*The Garden.*

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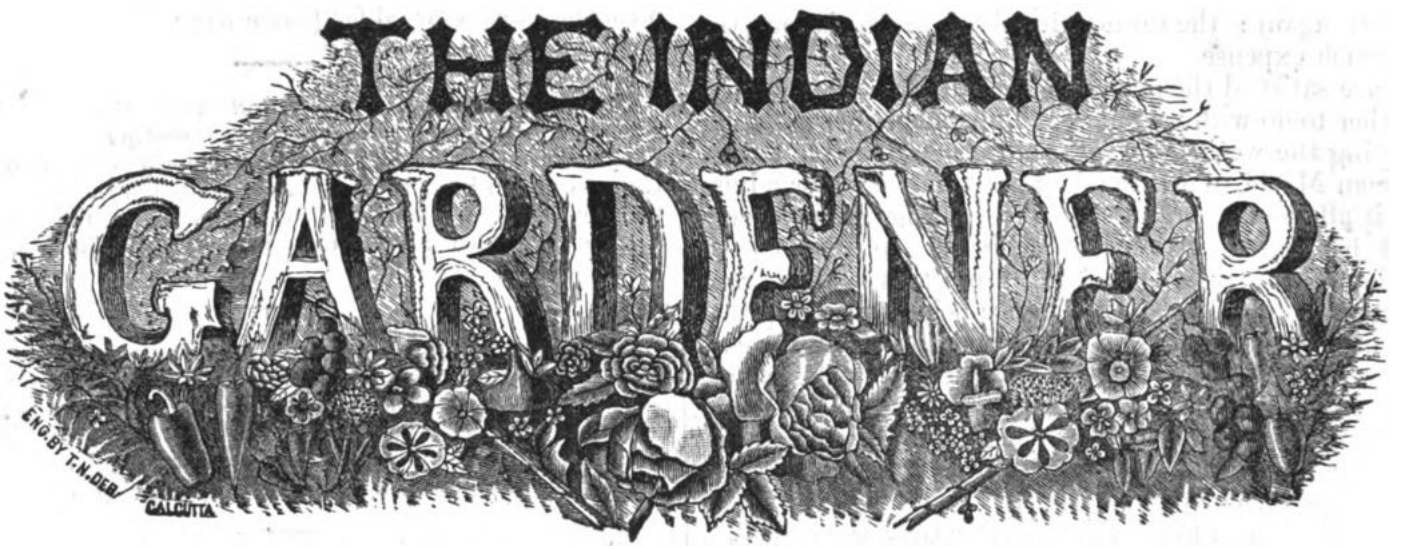

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HORTICULTURAL DIFFICULTIES.

We think it was the younger Stephenson who was taught by nature herself the practical axiom, never to contend directly with nature, but to speak her fair and stroke her canny wi' the hair. In constructing one of his railways on the Welsh or Lancashire Coast he made his embankment too near the full force of the breakers, and had the mortification of seeing it repeatedly washed away, when, if it had been constructed a little more inland, the force would have been expended on an inclined plane of sand. A beach of soft sand will remain unchanged for centuries while a great rock like Hoy or Heligoland is fast crumbling away. There are many more of nature's breakers which are quite as irresistible as those of the ocean, and it is just as hopeless to contend with them; but meet them half way, present them with the principle of the inclined plane, and they exhaust themselves or do a service even. All nature's forces are powerful to build or to destroy, and the more minute and quiet their action the greater seems the effect produced. Consider the result produced in one season by the growth of grass alone; it far exceeds the operation of the greatest of the earth's volcanoes. The gardener has entirely to deal with nature's minute forces, and he finds it always better to guide than to contend with them. For instance, one of nature's most powerful forces is the growth of vegetation, as we have just said; by allowing the branches of the fruit tree to extend, we allow the rush of vital force to exhaust itself, breaker fashion, on the sand, and our aim is attained with more benefit to the cultivator and to the tree. Determined cutting is like Stephenson's building, it teaches a practical lesson in the long run. Insect life is one of nature's destructive forces from the gardener's point of view. We need not wander from home to instance the locust. We have abundance of the genus aphis and flies of various denominations and colours—red spider and thrips, those spry and diminutive gentry altogether more formidable than the corpulent and dignified green-fly. Then there is the armour-plated scale—there is nothing really new under the sun—and its woolly cousin the mealy bug, the most irrepressible of all. It is a wonder that in these days of the division of labour some enterprising individual does not start business in some horticultural centre as a mealy-bug catcher. The war that is made on these multitudinous pests by the gardening fraternity is of a very savage character: we stifle them as Lord Dundonald proposed to do the Russians—by smoke or small dust; or we bathe them in some treacherous liquid, and half shirk ghastly blame by calling it an insecticide. We fear that after all we shall be beaten in the direct contest; even the best insecticide we are acquainted with,—industry and plenty of clean water—will not prevail unless otherwise applied. Every gardener knows how difficult it is sometimes to

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battle with red-spider, thrips, scale or fly even, with syringe and tobacco smoke—how they will be put down to return again: the former involves much labour, the latter much expense.

We are satisfied the principle of health in the plant has altogether to do with parasites—the principle of the strong destroying the weak, one of nature's destructive forces. Alderman Mechi some years ago got laughed at for advising that all the borders of fields adjoining game covers should be highly manured and better cultivated than even the central parts, as the best protection against rabbits and ground game. This advice being quite contrary to the usual practice, it was considered one of his agricultural eccentricities; but he was quite right. The rabbit cannot endure soft rank food, it thrives best on hard, dry grass on sandy downs. Sheep also suffer in spring on the soft young grass and turnip tops if they have not some dry hay or chaff to qualify it. Even the ox and horse in the field are seen to avoid the rank coarse grass which has grown on a former deposit of manure, and will nibble at some bare sweet patches, where there is scarce a mouthful, in preference. Just the same principle holds good in insect life, neither red-spider nor thrips will attack a plant if it be sufficiently supplied with water and food for its healthy growth; but let the foliage get starved for a very short period from whatever cause, and those parasites appear directly, as if spontaneously. Get the suffering plant into a healthy condition again, and the pest is checked and the cleaning process easy. This is the true inclined plane to break the force of this formidable breaker.

Another instance where the gardener frequently contends with nature and finds disappointment, is in the matter of training, and especially in the case of flowering plants is this operation so frequently performed in defiance of nature's will. To our mind there is a failure in training an Allamanda, Stephanotis or a Cissus in innumerable coils round a balloon; but trained espalier fashion, with the sprays at liberty to stretch themselves out on either side or over the roof of a house, and we have a specimen worth seeing. After all, cultivation is more or less a contention with nature on the one hand and an encouragement of her on the other. We frequently court the sun himself in making an artificial climate, and immediately we contend with him by shading. The soil is put into a high state of cultivation for the production of vegetables; and those conditions are the most favorable for the growth of weeds. Fruit trees and Roses, and many things besides, are grafted on hardy stocks for the encouragement of nature, but there must be a sharp look out for suckers, else we are soon beaten, for grafted Roses without suckers are yet unknown. We improve the quality of fruits and immediately the birds and insects find them out, and good judges they are. In all our dealings with nature remember she is feminine, and remember Stephenson.—*Gardener*.

Editorial Notes.

CALIFORNIAN ORANGES, LEMONS AND VINES are acquiring importance, and are said by Californians to be "the best in the world." At the World's Fair at New Orleans the sweepstakes gold medal, two other gold medals, eleven silver medals, and thirty premiums, were awarded for Californian Citrus fruits.

DR. SCHOMBURGH'S REPORT ON THE BOTANIC GARDENS, Adelaide, for the year 1884 contains interesting particulars of the Elands Bean, the root of which is employed in tanning; the Kumara, which is an Ipomea closely related to the Sweet Potatoe, the root of which is valued as an esculent; and the tree Tomato, a plant of which fruited freely in the Royal Gardens, Kew, last year.

AT a recent Sunday School Anniversary near New York, the superintendent, instead of distributing chromos and bou-bons, gave each scholar a packet of ten varieties of flower seeds, with directions for sowing and care, and offered a prize, to be awarded at a horticultural exhibition by the scholars next summer, for the best results in potted and cut flowers from the open garden.

MAP OF BURMAH.—As will be seen from our Advertising columns, Messrs. Thos. Cook & Son, Tourist Agents, Calcutta, announce that they will present to all Subscribers to their periodical, for the year 1886, a Map of Burmah, comprising the whole theatre of the probable operation of the War [Scale 35—56 miles to an inch]: also Table of Mail Service for 1886, which has been so much appreciated this year.

CLASSIFICATION OF SOILS.—Professor Johnston classifies them according to the clayey or sandy proportions, as follows:—1. Pure clay, from which no sand can be washed; 2 Strong clay or brick clay, which contains from 5 to 20 per cent. of sand; 3. Clay loam, which contains from 20 to 40 per cent. of sand; 4. Loam, which has from 40 to 70 per cent. of sand; 5. Sandy loam, which has from 70 to 90 per cent. of sand; 6. Light sand, which has less than 10 per cent. of clay.

HOW ELECTRICITY SPLITS TREES.—The theory that the splitting of the trunks of the trees by lightning is the result of the sudden evaporation of the liquids contained within them, has received much confirmation from experiments made by Osborn Reynolds, who succeeded in splitting small sticks of wood by passing the electric sparks through them after they had been impregnated with water. He also burst some glass-tubes which were filled with water, although the same tubes when empty allowed the electric sparks to jump through them without in the least disturbing them.

MILDEW ON ROSES.—The *Journal des Roses* gives two recipes for destroying mildew. The first is from M. Verdier. It recommends to boil for ten minutes 500 grammes (about 17½ oz.) of flowers of sulphur and an equal quantity of lime, in 6 litres (about 5¼ quarts) of water, often shaking the mixture. This solution is allowed to settle, and afterwards put into well-corked bottles. When required for use, 1 litre (about 1¾ pint) of this composition is put into 100 litres (about 21⅞ gallons) of water, and the plants are syringed with the mixture. The second is that of the Comte de Buisson; 2 or 3 grammes (about 1½ or 1½ drachm) of sea salt is dissolved in 10 litres (about 2⅛ gallons) of water and the foliage of the Rose plants on both the upper and under sides is syringed with this solution.

THE CEDARS OF LEBANON.—The Vienna *Politische Correspondenz* says:—"The once famous Cedar forest of Lebanon, formerly so extensive, has dwindled down to the dimensions of a mere thicket, numbering about 400 trees. To save it from complete destruction, and preserve it at least in its present extent, Rustem Pacha, the Governor-General of the Lebanon, has issued a special ordinance, containing a series of stringent regulations calculated

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to check, if not quite to put a stop to, the vandalism and carelessness of most travellers. It is expressly forbidden to put up tents, or other kinds of shelter, within the district of the trees, or to light fires, or to cook any provisions in their vicinity. No one is allowed to break off a bough or even a twig from the trees. It is forbidden to bring any beasts of burden, be they horses, mules, asses, or any other kind of animal, within the district. Should oxen, sheep, goat, or other pasturage cattle, be found within the proscribed limits, they will be irredeemably confiscated."

NAMES.—It is a pity that three such important products as Coca, the Cocoa of the breakfast-table, and the Cocoa-nut, though completely distinct both botanically and in their properties and uses, should have names so provokingly similar that most people, we believe, are puzzled to say which is which. The Erythroxylon Coca (says "Chambers's Journal") has no connection with the Cocoa tree (Theobroma Cocoa), which yields the well-known beverage cocoa or chocolate. Equally distinct from both is the Cocoa-nut Palm (Cocos nucifera), the fruit of which supplies the inhabitants of many tropical coasts and islands with a great part of their food, and also furnishes the Cocoa-nut oil of commerce. It is the more solid ingredient of this oil, known as Cocoa-nut butter, that is so much used as an unguent, when mixed with a little Olive-oil, to give it softness. Among many changes of nomenclature constantly going on, could nothing be done to remedy the perplexity caused by so many diverse articles being known by names so closely resembling each other?

SENSATION IN PLANTS.—M. Figuier believes that a plant has the sensation of pleasure and pain. Cold, for instance, he says, affects it painfully. We see it contract, or, so to speak, shiver under a violent depression of temperature. An abnormal elevation of temperature evidently causes it to suffer, for in many vegetables, when the heat is excessive, the leaves droop on the stalk, fold themselves together, and when the cool of evening comes, the leaves straighten, and the plant resumes a serene and undisturbed appearance. Drought causes evident suffering to plants, for when they are watered after a prolonged drought they show signs of satisfaction. The Sensitive Plant, touched by the finger, or only visited by a current of unwelcome air, folds its petals and contracts itself. Desfontaines saw one which he was conveying in a carriage fold its leaves while the vehicle was in motion, and expand them when it stopped—a proof that it was the motion that disturbed it. Sensation in plants is of the same kind as in animals, since electricity kills and crushes them as it does animals. Plants may be also put to sleep by washing them in opium dissolved in water, and hydrocyanic acid destroys their vitality as quickly as it does that of animals.

THE SUN.—Professor Langley, who recently gave an account at the Royal Institution of his ascent of Mount Whitney in Southern California, for the purpose of making investigations as to the nature of sunlight and the earth's atmosphere, concludes that the sun is blue. The apparent yellow colour is due to the fact that the atmosphere through which the light passes has absorbed or sifted out the other colours to a greater extent than the yellow. The solar heat is calculated to be capable of melting a shell of ice 60 yds. thick annually over the whole earth. The total loss by absorption from the atmosphere is nearly double what has been heretofore supposed, and the human race owes its existence and preservation to the heat-storing of the atmosphere even more than has been believed, for if the planet were allowed to radiate freely into space without any protecting atmospheric veil, its sunlit surface would probably fall, even in the Tropics, below the temperature of freezing mercury. The apparently limpid aërial sea above our heads and about us is carrying on a wonderfully intricate work on the sunbeam and on the heat returned from the soil, picking and sorting out selected parts in hundreds of places, and as one result changing the sunbeam on its way down to us in the manner indicated.—*Gardeners' Chronicle.*

NITRATE OF SODA.—The production of the powerful fertiliser nitrate of soda is almost exclusively confined to the province of Tarapaca in Peru, and in the pampas regions running north and south about eighty miles, and about twelve miles from the western shore. This vast plain, situated 3000 feet above the level of the sea, is at the foot of the Andes Mountains. The district is a rainless one, and the salts exude from the ground in some places from 7 to 8 feet in depth. It is frequently found quite pure, but when not so its impurities are extracted by dissolving in water and evaporating to dryness, either by the heat of the sun or by fuel. The chief port from which the nitrate has to be embarked is Iquique, a distance of ten miles from the nitre beds. Formerly the nitrate was conveyed upon the backs of camels or mules to the port, which, together with the expense of purification, made the total cost of production quite excessive. Since then a railway has been constructed, and the nitrate is obtained at a more reasonable expense. It needs to be applied to the land with care, and from 40 to 80 lbs. mixed with twice the weight of common salt is regarded as sufficient for an acre.—*American Cultivator.*

EVILS OF THICK PLANTING.—If we wish trees to be firmly rooted (says Dr. Balfour in an address to the Scottish Arboricultural Society), we must allow the branches to spread freely. When they are so planted that the branches and leaves of contiguous trees do not interfere with each other, and thus all parts are exposed to air and light equally, the roots spread vigorously and extensively, so as to fix the plants in the soil and to draw up copious supplies of nourishment. But in crowded plantations, where the branches are not allowed freedom of growth and exposure, the leaf-buds are either arrested or feebly developed, and the roots are of necessity injured. They do not spread, and the trees are liable to be blown over by the wind; they exhaust the soil in their vicinity, circumscribed by the roots of the trees around; their functions become languid, and thus they react on the stem and branches; so that the additions to the wood are small, and the timber is of inferior quality. In such a plantation there is a marked difference between the trees on the outside and those on the centre; the former having their branches and leaves fully exposed in one side grow with comparative vigour, and form excellent timber on that side of the stem where light and air are admitted; while the latter, hemmed in on all sides, are drawn up like bare poles, and produce a small amount of ill-conditioned wood. A crowded plantation, in which the trees are allowed to increase in size until they interfere with each other, cannot be easily reclaimed; for every attempt at thinning in this advanced stage of growth is accompanied with the risk of exposure to the blast, which speedily levels trees having no firm hold of the soil.—*The Garden.*

Original Articles.

THE ROSE.

HYBRID TEA ROSES.

This is an entirely new family of Roses that has sprung into existence during the past few years, and owes its origin almost exclusively to artificial hybridisation, most of the varieties being crosses between some species of tea and hybrid perpetuals. Now could we combine all the good qualities of the two races in one we should certainly have a group to satisfy even the most exacting of Rosarians, and such a result is probably only a matter of time. All the varieties of this class are but hybrids of one generation only, probably, as these are again inter-crossed with other varieties, the rough points and imperfections which many of them at present possess will become toned down or entirely obliterated. For with Roses, as with animals or birds, where two distinct breeds are crossed, we must frequently wait for even the third or fourth generation for satisfactory results.

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Already one or two varieties, such as Cheshunt Hybrid and Reine Marie Henriette, are taking a leading position in English rose-gardens. The great fault found, however, with most of them is that they do not open their flowers freely. This may be the case in England, but it certainly is not so in this country. For we have tried nearly all of them, and never yet saw a flower refuse to open, except occasionally in the rainy season, when we have scarcely any sun for days together. On the whole, we believe, these will eventually be found one of the most useful families of Roses for our climate. For they have these advantages: they are more hardy and vigorous than Tea Roses, and besides not only possess their free blooming qualities, but also embrace a wider range of colour. In fact they are just what is required where Roses are grown for quantity rather than for quality of bloom. They certainly do not possess the grand size and exquisite form, or the wonderfully varied shades of colour to be found in the hybrid perpetuals, nor can they lay claim to the delicate refined beauty found in most varieties of Tea Roses.

They should be treated in the same way as recommended for Tea Roses, pruning, however, rather more closely. The exact nature of this operation must, however, depend on the vigour and habit of each variety, points on which they differ very materially; some leaning closely to the Teas and others inclining to the habit of the Hybrid Perpetuals. The following list embraces all the varieties in this group:—

Name.	Description.	Habit of Growth.
Beauty of Stapleford ...	Outer range of petals very pale pinkish rose, gradually shaded to a deep rosy centre; flowers very large; petals well reflexed; seedling from *Alba rosea* and *Countess of Oxford*	free.
Camea	Bright China rose and deep yellow; almost always striped with white.....	free.
Cheshunt Hybrid.....	Colour cherry carmine; large, full, open flowers; very hardy and distinct.....	vig.
Countess of Pembroke....	Flowers of the finest form, quite full, and highly scented; colour soft; satin-rose..	vig.
Distinction.....	Flowers not very full but of good form; colour shaded peach of a tint difficult to describe; opens very freely.....	vig.
Duchess of Connaught....	Pale rose and lavender; dwarf hybrid habit; flowers large and well formed.....	mod.
Duchess of Westminster	Flowers exceedingly large, without being coarse, very finely formed; colour brightest cerise.....	rob.
Duke of Connaught	Flowers large; buds long and of very fine form; colour deep velvety crimson, edged with the brightest red; the best of this class	dwf.
Hon. George Bancroft...	Flowers very large; colour bright rosy crimson, shaded purple; distinct and good ...	mod.
Jean Lorthois	China-rose, deeper in the centre, changing to lilac; reverse of petals whitish; large and full.....	mod.
Jean Sisley	Flowers very large, very full of petals; colour outside petals rosy lilac, the centre bright pink	free.
Lady Mary Fitz William	Flowers exceedingly large, of globular form but scarcely full; colour bright delicate flesh, much resembling *Captain Christy* ...	vig.
Madame Barthelemy Levet	Rich, deep clear yellow; good form.....	vig.
Madame Etienne Levet...	Fine cherry red, bordered with copper yellow; large, full and good form	vig.
Mdlle. Brigitte Violette	Bright rose with light violet; large, very full and of good shape	free.
Michael Saunders.....	Flowers very large, of good form; very full colour, brouzy pink; highly scented	vig.
Nancy Lee	Colour bright rosy pink dwarf hybrid habit; moderate size, very free flowering	free.
Pearl.....	Pale flesh; flowers rather small, but pretty, much resembling a hybrid Noisette	mod.
Pierre Guillot	Bright dazzling red; petals bordered with white, very large erect flowers; well formed and a very free bloomer	vig.
Princess Imperiale Du Bresil.....	Bright carmine rose; large, very full and well formed; very sweet scented.....	vig.
Reine Marie Henriette ...	A red *Gloire de Dijon*; large and full, well formed, growth very vigorous, makes a good climbing rose.....	vig.
Viscountess Falmouth ...	Flowers very large and of good form; colour very delicate pinkish rose; back of the petals bright pink; highly scented like the Moss rose.....	free.

Noisette Roses.

The first species of this group was raised in America by Phillipe Noisette in 1814 and sent by him to his brother Monsieur Louis Noisette, at that time one of the leading nurserymen in Paris in 1817.

It was produced from the seed of the old Musk rose (*Rosa Moschata*), the flowers of which had been fertilised with the common China rose. In the true Noisette family the peculiar perfume of the Musk rose is very apparent, but in a very large number of varieties belonging to or rather classed in this group, this distinctive feature has almost entirely disappeared, owing, of course, to the fact that many of them are the result of crosses between a Noisette and some variety of Tea or other Rose. This inter-crossing has been carried to such an extent that if we trace the pedigree of some of the best varieties we shall find they have not had a true Noisette as a parent for three or four generations, and in most instances one of the parents in each generation has belonged to a distinct family. All this has given rise to much confusion in the classification of many varieties. Take, for instance, the lord of the whole Rose creation—"Marechal Neil"; sometimes he is a "Noisette," frequently a "Tea Noisette," and occasionally a "Tea" only. The attempt made by several competent authorities to form a separate class under the term of "Tea Noisettes" cannot be said to have been successful. The difficulty seems to be to know what to take from and what to retain in the original group; nor is the term "Tea Noisette" strictly applicable to this hybrid group, as many of the varieties that are sometimes placed under it have been the result of crosses with other distinct families, for instance, Triomphe de Rennes had a true Bourbon Rose as one of its parents.

This is certainly one of the most useful and valuable families of roses in this country, as it is on them that we have mainly to depend for climbing varieties, and grown in this way they never fail to bloom profusely, that is, if treated liberally and pruned judiciously. For this purpose we must, of course, select the strong growing varieties, such as Marechal Neil, Lamarque, Solfaterre, Cloth of Gold, Triomphe de Rennes, and Celine Forestier. In pruning these all that is necessary to be done is to cut back the strong growths about one or two feet only; this will induce them to throw out side shoots freely, on which the blooms will be produced. They are apt to become crowded with weak barren wood in the centre; these should all be cut back to within one or two buds of the main stems. One thing must be borne in mind, that is, if we want these climbing varieties to grow to perfection, we must supply them with food and drink on the most liberal scale, to force the vigorous shoots essential to the production of the grand profusion of bloom they invariably bear when all their requirements are carefully attended to. In England it is no uncommon thing for plants of Marechal Neil to throw up shoots 20 or 25 feet long and produce from 1,000 to 2,000 flowers in a season. What an enormous strain this is on the plant we can easily imagine. If this subject was in the hands of that most scientific of Indian horticulturists, Lieutenant Pogson, he would probably be able to tell us the exact quantities of sulphates of iron and lime or other chemicals necessary to support the plant through such a trial.

The dwarf varieties of Noisettes, though generally producing small flowers, are extremely valuable where quantity rather than quality is a desideratum. These should be treated in the same manner as Tea Roses.

The best Noisette Roses.

Name.	Description.	Habit of Growth.
Aimee Vibert.....	Pure white, blooming in large clusters; very handsome, glossy foliage.....	vig.
Aimee Vibert (variegated)	A variety of the above with distinct margined leaves.....	vig.
American Banner.....	Striped rose and white like the York and Lancaster; semi-double; more curious than beautiful	free.
Bouquet d'Or.....	Deep yellow centre, copper colour, of medium size and full	vig.
*Celine Forestier**	Deep canary yellow; outer petals pale yellow; flowers good sized; well formed and very fragrant	vig.

The varieties marked thus * are the best suited for climbers.

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Name.	Description.	Habit of Growth.
*Cloth of Gold**	Pure yellow; globular; very large and very double; a superb rose but rather sky boomer	vig.
Eclair de Jupiter	Light crimson colour, very beautiful and attractive	vig.
Fellenberg	Crimson; very bright and beautiful; blooming very freely in clusters; semi-double only	vig.
Jaune Despres	Fawn colour, pink and fawn centre; highly scented and very vigorous	vig.
*Lamarque**	Sulphur yellow, very large and full; blooms freely in clusters	vig.
Emily Plantier	French white, light coppery tinge; flowers small but very pretty	vig.
*Madame A. Carriere**	Flesh white, salmon yellow at the base of petals; large, full and well formed; a very vigorous climber	vig.
Madame Caroline Kuster	Centre canary yellow; outer petals pale lemon; flowers large and globular	vig.
Madame Miolan Carvalho	Deep sulphur yellow; large, full and good form; a seedling from *Cloth of Gold*	vig.
*Marechal Neil**	Rich, brilliant yellow; petals large, smooth and of good substance; flowers very large, full, deep, and of exquisite form; the most superb of all yellow roses, almost too well known now to need any description	vig.
Ophiria	Bright salmon and fawn; distinct and peculiar.	vig.
Reve d'Or	Orange yellow; flowers moderate size and full; a good climber	vig.
*Solfaterre**	Fine sulphur yellow; superb, large and very full	vig.
*Triomphe de Rennes**	Straw, centre pale yellow, highly fragrant; flowers of good size and well formed	vig.
Unique Jaune	Pale fawn with flesh tint, very pretty and distinct colour; blooms in clusters	vig.
*W. A. Richardson**	Beautiful orange yellow; large full and good shape; very vigorous	vig.

The varieties marked thus * are the best suited for climbers.

THE VERBENA.

The Verbena is undoubtedly one of the most useful bedding plants we possess in this country, being not only of a hardy constitution, but thriving well under almost any circumstances, and producing their brilliant, hued, diversely coloured flowers more freely than almost any other plant we could name. This plant is, properly speaking, a perennial, and can with care be kept from year to year in a thriving condition, provided it is grown in a well raised position, where there is no possibility of water stagnating at the roots, and in a good light, porous soil; not that we recommend this system of culture—at least in the plains—for there is no questioning the fact that neither old plants nor even young plants raised from cuttings or layers, ever produce flowers of equal quality to those borne on young healthy seedlings. We have for years adopted the practice of treating the Verbena as an annual, and with unvarying success. The peculiar pleasure derived from raising seedlings—the hopes and uncertainties that are inseparable from it—the upspringing in glory of some form of satisfying beauty—or the appearance of others in gross and unworthy characters need not be touched on here. It is an occupation full of subtle satisfaction to any one who can open his soul to the reception of things clothed in the grace of the beautiful. And to ensure this as far as possible he should sow good seed—not only good in relation to its growth, but rich in that higher form of goodness likely to largely reward the sower's toils. It sometimes falls to the lot of the sower to have to complain that the seeds he puts into the ground with so much care does not germinate. It is not unfrequently laid to the charge of Verbena seed that it does not grow; and the accusation is laid at the door of the seedsman that he did not supply good seed, when it does not occur to him who fails with his seed that it might be owing to a want of knowledge or skill on his own part. You can no more coerce seeds and the laws by which they germinate and grow, than you can sentient animals; perhaps the latter are the most plastic in the handt of him who uses force. There is little difficulty in raising Verbenas from seed if only the right method be adopted; and it need scarcely be stated, that he who sows should care only to operate with seeds likely to produce appreciable results in point of quality. Seed may be sown at any time from the middle of September to the end of October, or even later; we prefer, however, to make all our sowings by the first week of October: this ensures the plants a long blooming season before the hot weather sets in. Sowings should be made in pans of light moderately rich soil under shelter, and they should be kept entirely in the dark until germination takes place, which will generally be in eight to ten days, when they should be gradually inured to the light, but not to direct sunshine. If the seedlings have come up too thickly, prick them out into other pans as soon as they have made their first pair of perfect leaves, placing them about three inches apart—or if space is available, a better plan is to put them singly into three-inch pots, in which they may remain till they are large enough to be planted out. It must be remembered that the Verbena loves a well-enriched soil, and in preparing beds for them a layer of at least three inches of very old cow manure should be worked into the soil to a depth of at least nine inches. In planting do so firmly, and after the sun has lost his power in the afternoon, so that the plants may have time to get somewhat at home before the ordeal of a hot day comes on them. Shortly after growth has been commenced, a slight layer of sifted dung mixed with fresh soot placed over the surface of the bed, will, with occasional stirrings of the surface, make everything right in that direction. After pegging out the main shoots, and occasionally thinning out weakly growths where overcrowding is likely to do the plants harm, and pinching off the trusses as they begin to go off, nothing more will be required.

Propagating by Cuttings.

First of all, see that your plants are in a fit state from which to take cuttings, and next determine the most convenient plan of propagation, and have all ready before a single cutting is taken off. Have the pots or pans washed clean, crocked and filled up with leaf-mould and sand in the proportion of two-thirds of the former to one of the latter, sprinkle the surface of the soil in the pots or pans with water through a fine rose; then have the cuttings taken off, and while they are being prepared for insertion dew them over with water through a syringe to keep them from flagging. As the process of insertion is being proceeded with, see that every cutting is made fast at its base and not about the middle. Water well, so as to fill in the holes, and place the pans level in the frame already prepared for their reception. Keep the cutting from flagging from the time when it is severed from its parent till it has formed roots and become an independent plant. This is done by shading and by frequent syringings overhead, which may be reduced gradually as the plants become established.

The next matter to be attended to is transplanting the rooted cuttings into pans of rich soil. In doing this, one must be mindful not to compromise or impede their future health by exposing them to influences that would cause any check to growth. The pans for this purpose should not be less than 4 in. deep, and be clean washed and carefully drained.

Of the soil itself little need be said. It can hardly be too rich, and it should be thoroughly prepared beforehand, such preparation depending, of course, on the nature and quality of the material about to be used. Keep the plants from 2 in. to 3 in. apart in the pans, and make the soil firm about their roots, so that while the soil encourages vigorous growth, the latter may be moderated by the mechanical pressure brought to bear upon the roots, thus inducing them to become fibrous and compact rather than straggling.

Pot Culture.

Verbenas are frequently cultivated in pots, and beautiful objects they are when well grown, but to accomplish this in the case of Verbenas, as in that of every other plant used for a similar purpose, they must be attended to constantly and well, never allowing green-fly or mildew a footing on them, nor the shoots to fall over each other by getting top heavy through neglect of supports or want of pinching. Do not over-pot with the object of saving time: the rule to follow in regard to potting is to give larger shifts whenever the pots get filled with roots, until the plants have reached the dimensions desired,

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pinching out the points of those shoots that threaten to destroy the symmetry of the plant through too vigorous growth. The compost should consist of three parts light rich loam, one part leaf mould and one part fresh horse droppings rubbed through a sieve. The loam should not be sifted but well broken up, and these ingredients should be properly incorporated. Drainage is an important consideration, let this be open and free by placing carefully plenty of broken crocks into each pot and covering these with a layer of cocoanut fibre or Moss. Water copiously from the time when active growth commences until the flowering is over; they should also be syringed with soapy water once a week to prevent green-fly or mildew becoming established.

PROFITABLE GARDENING.

Gardening is so generally looked upon as an expensive luxury by those who take no practical interest in the subject, and, we fear, in too many instances is actually found to be so by others who pretend to take an interest in the pursuit, but which in reality they do not feel, that it is interesting to be able to turn to the other side of the question and show what can be done, and is being done, under an intelligent system of cultivation. The following extract from a lecture recently read before the Ingham County Michigan Horticultural Society speaks for itself, and although our readers must bear in mind that these facts and figures come from that land of wonders—America—still there is no doubt that, with every allowance, it represents a measure of success not yet dreamt of by cultivators in this country.

"Horticulture, that branch of culture which includes the growing of fruit, flowers, and vegetables, is of necessity bounded by narrow limits in acres. Let us at the outset make two divisions of it which may be termed extensive and intensive. Extensive horticulture is illustrated in the great orchards and fruit farms of Michigan and other States; intensive horticulture is fairly represented in suburban market gardens and fruit farms. It is a matter of vital importance that we familiarise ourselves with the process by which three or four or even more crops are raised on a single acre of land in one year. The time is not distant when such knowledge will be to many a necessity. We are drifting toward this high culture which alone overreaches severe competition. Our large cities, and gradually also our smaller villages, must be supplied with fresh and nutritious fruits and vegetables, but it is only growers who can grow the most, the earliest, and the best on the least ground who can hope for great success in gardening. The most instructive illustrations of intensive horticulture are found among market gardeners near large cities. No other class of cultivators understands so well the secret of making the earth yield its utmost. The secret of their success lies in the promptness and thoroughness with which every operation is conducted. Their methods are for the most part simple and capable of application to any garden. The garden vegetables rarely bring what the general cultivator would call high prices. They are articles of universal consumption, and so cheap that every family in city and country can afford them. Most of them can be readily grown by any one on land ten times cheaper than the valuable acres in the vicinity of the large cities. How, then, does the market gardener make his money? His secret lines in these two causes: he grows more vegetables to the acre than the ordinary cultivator, and he markets them in better season and in a more attractive condition. The average farmer, with land worth but £10 or so an acre, and manure costing but a trifle, makes a bare margin from Cabbages, but the expert market gardener, on land worth £200 an acre, and with a considerable outlay for manure, realises a good profit. As to high culture, it is necessary at once to understand that it is three-sided, and that all sides must be simultaneously developed. It consists of good tillage, abundant fertilising, and judicious planning as to the succession of crops. Good tillage is not keeping down weeds—it is stirring the soil deeply and often for the direct benefit of the crop. I know of no fallacy so unfounded as that which uses the hoe only when weeds become conspicuous. Good tillage kills the weeds while they are still under the surface. I never knew a market gardener who knew or who cared much about weeds. In a cer tain garden of 100 acres I never saw a weed, unless it grew along a path or about a compost heap. Weeds are only a goad to prick up the shiftless cultivator. If not this, they may be regarded as a warning not to cultivate more than one can cultivate well.

Next to the care of the soil itself, manure is the most important consideration. A market gardener does not consider a good dressing of manure once in two or three years to be sufficient; that is not high culture. Every acre must be annually heavily manured. A good grower usually has little faith in the value of manure the second year after it is applied. He applies it to his land in a thoroughly decayed conidtion, and expects to reap his reward at once. For certain crops he even applies it twice a year. Even after several years of this excessive manuring, should a year be skipped, the crops will almost universally fail to produce a profit. Mr. Peter Henderson relates an apt illustration of this sort. A market gardener of twenty years' experience, and whose premises had always been a perfect model of productiveness, proposed to run a street through his grounds. Thinking this land sufficiently rich to carry a crop of Cabbages without manure, he gave it no attention. On either side of the street he applied guano at the rate of 1200 pounds to the acre. Upon the unfertilised portion and the contiguous areas he planted early Cabbages. From the fertilised ground his Cabbages brought him £280 per acre; from the unfertilised, £66 per acre—a loss per acre of over £200. The double cropping of lands is the distinctive feature of intensive horticulture. The *multum in parvo*, the ever persistent cropping of every foot of ground in every available season, is the only method of realising a profit from high-priced land. A good story is told of a shrewd gardener who hired a piece of land at a nominal price, allowing the owner the privilege of entering upon the land at any time by paying him the value of the crop upon it. The owner soon saw the increasing value of his land, but after watching it for several years, he could not find a time when the crops upon the ground were not worth more than the ground itself, and he was finally obliged to sell to the tenant at a very low figure. A skilful gardener who has a small place contrives to keep some crop upon the land the year round. Most of his vegetables are started in hot-beds, cold frames, or especially prepared seed beds, and are transplanted to the open as soon as some crop is harvested. In this manner no time is lost in waiting for seeds to germinate. A simple illustration of triple cropping is the growing of Radishes, Carrots, and Celery upon the same ground. The Radishes and Carrots are sown at the same time in alternate rows under glass frames. These spring cold frames are made simply by laying sashes across two boards which stand edgewise and run parallel to each other at a distance of 6 feet apart, forming the sides of the same. These boards are moveable, and upon the advent of warm weather, they and the sashes are piled away. The earlier Radishes are marketed before the weather is warm enough to remove the sashes, and the Carrots soon have the whole ground. By the middle of June the Carrots begin to come into market, but before they are all harvested, Celery has been set between every third or fourth row, and it soon occupies the space."

GROUND ORCHIDS.

The representative of this portion of the Orchid family are more widely distributed over the globe than those of an epiphytal character, for, although in tropical countries the latter-named varieties predominate, as we trace Orchids through the cooler latitudes we find the epiphytal varieties gradually give place to the terrestrial, until in cold countries the epiphytes are lost, and the Orchids are all terrestrial, these latter having many representatives in Great Britain, North America, and some even in the most northern parts of Russia. In warm countries many of the varieties commonly found growing on the ground are frequently to be met with on the larger branches and the trunks of trees, the genera Cypripedium and Pleione being particularly liable to these variations; but, as under all circumstances they are found in some depth of accumulated vegetable deposit, under cultivation they succeed best when treated as true terrestrial Orchids. In

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order to prevent confusion, these remarks will not be confined to those varieties found growing on the ground only, but will include a few sub-terrestrial kinds requiring similar treatment.

Evergreen terrestrial Orchids differ mainly from the epiphytal varieties in that they require but a short period of rest, most of them growing throughout the whole year, except during the short period that they are in bloom, and at this time they should be placed in a somewhat cooler and drier house, which will give the plants a rest, and also preserve the flowers, which would otherwise be injured by the damp atmosphere of the growing house; but even during the brief resting season the evergreen varieties should not be allowed to get quite dry. All deciduous terrestrial Orchids, such as Calanthe vestita, the Pleiones, &c., require as distinct a resting season as the epiphytal Orchids, and on losing their leaves should be placed in a cooler house and not be watered until they show signs of renewed growth. Both the evergreen and deciduous kinds thrive best in pots, which, for the stronger-growing sorts, should be larger in proportion to the size of the plant than those used for epiphytal varieties, and should be crocked one-fourth of the way up, placing a layer of Sphagnum Moss over the crocks, and on that a layer of charcoal mixed with equal parts of the most fibry portion of the soil; let this compost occupy about one-third of the pots for strong-growing plants and one-half for the smaller growing kinds. In potting a terrestrial Orchid, turn the plant out, and remove as much of the old soil as possible without injuring the roots; then take a suitable sized pot, previously prepared as directed, place the roots in the pot, keeping the crown of the plant a little above the level of the rim; fill in carefully between the roots with the compost in use, not pressing it too hard, and leave the plant in such a position that when it settles down a little the crown or neck will be level with the rim of the pot, always bearing in mind that, although some of the Cypripediums and a few others of like habit are rather benefited than otherwise by being kept a little above the pot, the strong-growing kinds, such as Calanthe, Phajus, and most other terrestrial Orchids, thrive best below the rims. With regard to the best time for potting, the most intelligible rule, and one that holds good in all cases, is, that the plants should be potted soon after they have done flowering, for most of the terrestrial Orchids flowering out of the mature growth, or with the newly started young growth, and not having pseudo-bulbs to supply them with nourishment and carry them over any check they might receive, if potted at any other time, are likely to be prevented from flowering, and if not in a sufficiently warm place to induce them to grow the plants will be injured; but as it is desirable to place them when in flower in a cooler and drier house, and as they are frequently used for decoration in the dwelling-house during that period, care should be taken, when the plant is out of flower, that it be not potted out of the cooler house or dwelling house and then transferred to the warm house to grow, but that plants should be placed in their selected positions for at least a week before potting, it being a great mistake to pot any Orchid, either terrestrial or epiphytal, from a cold house and place it in a hot one, or *vice versa*. The whole of the evergreen, tropical terrestrial Orchids will succeed well in an ordinary cool stove or intermediate house mixed with other plants, and will require no different treatment, except to be moved to the cooler and drier end of the house while they are in bloom. Lest amateurs should be in doubt as to which are terrestrial varieties, it will be well to enumerate some of the leading kinds, together with a few others which are sometimes found on rocks or low down on the trunks of trees, and therefore have been found to succeed best when treated as true terrestrial Orchids.

The evergreen Calanthes are noble-looking plants either in or out of flower. C. veratrifolia, bearing spikes of snow-white flowers, often 3 ft. in height, and lasting a long time in perfection; there are two varieties of this plant, one being early winter flowering, and the other coming in at the commencement of summer. C. Masuca is similar in habit to C. veratrifolia, but has mauve-coloured flowers. C. curculigoides grows about half the size of the above two varieties, and has yellow flowers. C. furcata and C. Dominii, the latter being a hybrid raised in this country, and having lilac and purple flowers, are also beautiful varieties of this section; they succeed best in a mixture of two-thirds turfy loam and one-third leaf-mould. Many good cultivators mix manure with the compost used for potting strong-growing terrestrial Orchids, and produce very fine plants; but equally good ones are to be grown without it, and as manure of the requisite quality is not always to be obtained, the amateur will find it better to adhere to the natural soils as recommended above. The Calanthes are from India, Java, &c., and should be grown in a warm, airy house. Calanthe vestita rubro-oculata, pure white, with crimson centre; C. vestita luteo-oculata, the same with yellow centre; C. vestita nivalis, all white; C. vestita Turnerii, white, with rose centre: and C. Veitchii, rosy-pink, are all deciduous kinds, and should be grown in a warm house, and kept well supplied with water until they flower, after which they should be placed in a cooler house, and water withheld until they show signs of a renewed growth, when they should again be placed in the warm house and shortly after potted. The soil recommended for the other Calanthes is the best with the addition of a little silver sand.

Limatodes rosea requires similar treatment to the deciduous Calanthes, which it resembles, but should be potted in two-thirds peat and the rest loam and silver sand.

Phajus grandifolius, P. Wallichii, and P. bicolor, are large-growing evergreen Orchids, resembling each other in habit and in the character of their flowers. P. maculatus has large deep green leaves beautifully spotted with yellow, and bears spikes of large clear yellow flowers; they come from North India, Ceylon and China, and should be placed in warm house, and after the growth is matured be transferred to much cooler house, and but sparingly watered for a time; their flowering season is winter and spring, but by careful management they can be flowered at almost any other time. They require the same soil as the evergreen Calanthes.

The Bletias are elegant-growing Orchids of deciduous habit, throwing up their slender spikes of generally rose or purplish-coloured flowers from among the leaves. They thrive in the same compost as the deciduous Calanthes, and should be grown in the intermediate house, after which they should have a good resting season in a cooler house, not withholding water altogether.

Sobralias are handsome plants, often 6 ft. in height, and bear large light or dark rose-coloured flowers on the tops of their reed-like stems; they succeed best in the intermediate house, potted in sandy peat, and only require a little rest while in flower.

Epistephium Williamsii and E. grandiflorum are like the Sobralias in habit, but have their flowers, seven or eight, on a spike.

Lissochilus Horsfallii is a rare and beautiful variety from Old Calabar; it has the general appearance of Phajus grandifolius, and should, as far as possible, be treated in the same way.

Cymbidium Eburneun, C. Mastersii and most of the strong-growing Cymbidiums are often found growing among rocks; the two varieties named are certainly the best. *C. Eburneum* flowers in spring, and has large waxy white flowers, generally produced in pairs *C. Mastersii* has long drooping spikes of white flowers, ten or twelve on a spike, each flower about one-third of the size of those of the other variety. They come from the Himalayas, and are found growing at an elevation of 6000 ft., consequently they will not thrive for any length of time in a hot-house. The Pleiones are small growing gems among Orchids, and are generally supposed to be difficult to grow; but this is not the case when the habits of the plants are studied. They all come from high elevations in India, and should be grown in an intermediate house, being freely supplied with water while growing.—*The Garden.*

WORK IN SEASON.

THE VEGETABLE GARDEN.

Attend to the directions laid down in our last issue. Thin all crops as they advance; keep the hoe and the rake fully employed in every part of the garden. Support with stakes the crops that may require it, and water as far as it is practicable everything that stands in need of it. Destroy insects, eradicate grubs, which at this season are by far more mischievous in the garden than any other object. Destroy slugs by picking or by watering with lime water or strewing lime and soot round the plants, where watering is necessary, let it be done early in the morning or late in the evening, the latter for preference.

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The second crops of Cauliflowers, Cabbages and other members of the Brassica tribe should now be ready for planting out. Successional sowings of these may still be made, for although a large percentage of them may not heart properly, still they will provide a large supply of greens or coleworts at a time when other vegetables are scarce.

CELERY.—Continue to put out Celery as the plants are ready, and remember that small, sturdy plants are always better than lanky over-grown ones. Take up plants with a good ball of earth to prevent their feeling much of a check.

Plenty of work will be found in the vegetable garden for the next few days in bringing up the arrears of work advised to be done in previous issues. Though it is not too late to sow and plant many crops advised to be taken in hand within the past month, the earlier they now receive attention the better. It should be constantly borne in mind that it needs as much labour to sow and plant crops a month behind hand as it does at the proper time, with perhaps not half the return for the labour.

Thin out all crops that require attention, and endeavour to finish the thinning before they are likely to receive any injury from over-crowding.

LETTUCES must not be tied up when the sun is shining brightly on them in the middle of the day, neither must the foliage be damp from due or rain. When they have to be transplanted from the seed bed, they should be well shaded for a few days after this operation is performed; it is however advisable, where possible, to sow Lettuces where they are intended to remain. The seed can be sown very thinly, and the plants thinned out when they are nicely up.

PEAS should be earthed up and sticks put to those varieties that require them.

KIDNEY BEANS should be sown for a successional crop. Thin out those already planted to a distance of 9 inches apart in the rows; it is a great mistake to allow the plants to remain crowded together as is so frequently done.

There is no work in the kitchen garden which at this time requires greater attention than the eradication of weeds; many will soon begin to perfect their seeds, which being shed on the ground will occasion a considerable degree of labour for several years to accomplish their extirpation.

THE FLOWER GARDEN.

PRUNING ROSES.—This operation if not already completed should be pushed on as speedily as possible, instructions regarding which have already been given in previous issues.

MANURING ROSES.—Roses require feeding. The more food the richer the colours, the larger the size, the more solid the texure and more marvellous still the sweeter the fragrance. There is however a proper time for manuring Roses; many give it too late in the season, they seem to imagine that when the strain is heaviest on Roses or other plants, that is the time to assist them with stimulants; and so it would be could the stimulants get at them, but it takes a long while for solid dressings applied at the roots to reach Rose leaves and flowers, even liquid manure, of which we are accustomed to speak and write as if it acted at once, takes days, weeks, and even in some cases months to reach the points where it is most needed in our Rose trees; while as for solids, they have to undergo no one knows how many processes of comminution and chemical decomposition. and perhaps recomposition, before one particle of their strength can go to support the Rose either in its efforts at growing or flowering, the season here in which Roses can be grown in anything like their natural beauty being necessarily a very short one, we should not only seize the first opportunity after their annual hibernation to apply stimulants, but these stimulants should be applied in the most soluble form possible. The subject of manures for Roses was fully treated on at page 215, Vol. I.

ROSES IN POTS.—After being pruned, all that it require should be potted at once, giving more root-room where needed. The soil used should be strong loam with a sprinkling of sand and some good rotten manure, but no leaf-mould or light material, such as is sometimes employed, and which is quite unfit for Roses. See that the drainage is sufficient and well secured against the soil getting down into it. In potting these, which will principally be Tea varieties, it is scarcely possible to ram the soil too hard, neither must the pots be filled so full as not to allow sufficient water, of which they will require a daily application, enough being given to moisten the whole at once. All such plants as do not need larger pots should be turned out; the drainage should be examined and as much of the old surface soil should be got away as can be done without interfering with the roots, replacing it with new material, which should also be well examined in, so as to make it quite solid. Previous to potting the plants would be all the better for being laid on their sides and syringed freely with Tobacco water.

ANNUALS.—The present is a good time for making a second sowing of most of the free growing varieties, notably Mignonette Candytuft, Sweet Peas, Poppies, Nemophilas, Larkspurs, Lovelies-bleeding, and others. The soil should have previously been well worked and the seed be sown thinly in patches where the plants are required to flower. If the soil be at all stiff it is advisable to cover with other light sifted soil, as the seed must not be heavily covered. A few sturdy plants will give a more lasting display of a better quality than is the case where the seeds are sown thickly and the seedlings not freely thinned out.

CONSERVATORY.—Ornamental Foliage Plants, such as Crotons, Dracænas, Panax, etc., should be syringed at least once a day. During the cold season the operation should be performed in the morning two or three hours after sunrise. On no account water them in the evenings, as by so doing we materially reduce the temperature just at a time that the plants require most warmth. It is generally the neglect of this precaution that leads to the loss of foliage we hear so many complaints of at this season of the year.

ORCHIDS.—This family now requires very strict attention, as the next season's blooming will entirely depend on the treatment the plants receive during the next two or three months. When orchids are all in vigorous growth, we may treat them almost indiscriminately as one family without distinction, but at their resting period, we must study the requirements of each genera separately, and frequently also of individual species. Phalænopsis, Aerides, Vandas, Cypripediums and others, of what we may call the evergreen class, require just sufficient moisture to keep the foliage plump and healthy—and no more. Dendrobes, Cœlogynes, and also most of the terrestrial species of this family, will scarcely require watering at all, especially where fully exposed to the dew and sheltered from the sun.

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All matter intended for publication, and all questions to be replied to, should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

SEEDING OF ORCHIDS.

When the last Orchid shall have reached us from its native habitat, we shall naturally have to depend upon the hybridiser's art for new forms of this interesting family.

This day may be far distant, but who can say that it will not come in our time? Exploration goes on rapidly, and at its present rate the unexplored area inhabited by Orchids will every year be materially reduced. I venture indeed to predict that in twenty years' time there will remain but little to be discovered. Happily, the labours of a few have shown that even when we shall have become acquainted with every species we are not likely to lose the charm of novelty, and we may take it for granted that the raising of Orchids from seed will have an importance which it has not yet assumed. Prominent among those who have made the seeding of Orchids a special study is the well-known French amateur, M. Bleu, famed for his remarkable success in the raising of new Caladiums. In a paper recently contributed to the French National Horticultural Society, entitled "The Fertilisation of Orchids and attendant phenomena," M. Bleu gives the result of many years' practical experience. Thinking it may interest some of your readers, I here give the most important portions of the article in question. "It is well known that Orchids, owing to the peculiar arrangement of their reproductive organs, would, in the great majority of cases, and even in their native country, remain sterile if it were not, as has been observed by naturalists, amongst whom may be cited Darwin, Hermann, Muller, &c., for insect agency. To this element of success in the fertilisation of Orchids I would add that of the action of violent winds or of the wings of birds in flight, which lay bare the pollen masses by knocking off the cap that covers them, so that the pollen heads are brought into contact with the stigmas, and fertilisation takes place. But it is remarkable that it is only with a very limited number of kinds that fertilisation takes place in this way. I have often had the opportunity of seeing the arrival of imported Orchids, and all who have received plants direct from their native country, will be able to corroborate my statement, that with rare exceptions but few species, amongst which may be mentioned Phajus grandiflorus Aerides affine, and Vanda Roxburghi, seed at all freely. In my practice, the only species I have ever observed to seed naturally are Lælia cinnabarina, Cypripedium Schlimi, javanicum, virens, and Bullerianum.

It will thus be easily understood that the hybridiser who is protected against such influences can work with much certainty. It is, indeed, easy for him to ascertain in the case of those epiphytal species of which the pollen is united into solid invisible lumps if fertilisation has really taken place, not only by reason of the size of the pollen grains, but on account of the effect that the contact of the pollen produces on the stigma. Although during two-thirds of the flowering time fertilisation may be effected, if it is wished to operate on species not nearly related, it must be done as soon as the flower opens, and when the generative energy is strongest. Once a flower is fertilised it is not susceptible of the slightest influence from other pollen, but if the operator wishes to make it quite sure, it suffices, as I often do myself in the case of certain delicate plants, to immediately enclose the flower in a paper bag closed at the top and tied at the bottom. The day following fertilisation the flower commences to close, its brightness fades, its perfume loses its sweetness, and the sepals, petals, and labellum wither. This is at least what is observable in species hereafter mentioned. The ovary swells and lengthens every day in a surprising manner, attaining, in a general way, its maximum development in a third of the time necessary to bring it to maturity.

Another peculiarity hardly suspected, but of which repeated observations leave no doubt, is that simply cutting off the stamens produces exactly a similar effect, although more slowly manifested, to that effected by artificial fertilisation. Some days after the pollen masses have been removed, the flower operated upon dissociates itself from the rest by closing its sepals and petals, which quickly fade. I have mentioned that in the majority of cases the flower which has been fertilised commences to close the following day, but it is very different with the Cypripediums. This family, which is so distinct, forms an exception in nearly every way, but the most important is that which concerns the duration of the flowers, which is indeed but little shortened. I have many times fertilised flowers of Cypripedium which had been open a month, and have had the satisfaction of preserving them three weeks or more quite fresh. Among plants exhibited at a meeting held on the 19th December were two Cypripediums, of which one, C. ciliolare, had been fertilised five weeks, and the other, C. Spicerianum, a month before that. The flowers on both plants were perfectly fresh. Cypripediums possess other exceptional and remarkable peculiarities, one of which is that the ovary enlarges very slowly and attains comparatively small proportions; the number of sides, too, contained in a capsule of Cypripedium is not one-hundredth of that in a pod of Cattleya. When a flower of Lælia, Cattleya, Oncidium, Ansellia, &c. is fertilised, that one closes while the others borne on the same stem do not show any alteration and contrast more strikingly with it. For instance, a flower of Cattleya Loddigesi which was crossed with the pretty Sophronitis grandiflora, had the ovary much developed, whilst the remaining blooms were in a perfect condition; but if it had been a question of Phalænopsis Schilleriana, the flower operated on would have closed on the morrow, and two days later all the rest, no matter how many, would have faded. Observations made at various times enable me to judge of the long duration of the generative faculty of this species, and very probably of P. Stuartiana, which in all its parts, seems to be but a white variety of the former. I have in my Collection a plant the flowers of which last well three months. Not wishing to deprive myself of such a long blooming time, and on the other hand being desirous of utilising it for hybridising purposes, on April 18, 1882, I fertilised a flower of it which opened on January 16, that is to say, three months previous, and the operation was quite successful. When fertilisation has been effected the ovary perceptibly develops and enlarges, in some months attaining its full size. It then seems as if the seeds, which are extremely small and very numerous, were every day about to emerge from the capsule, but this is the time when patience is needed, for the seeds require quite twice the time to bring them to maturity that has elapsed from the moment of fertilisation. The following list shows how long each species requires to ripen its seeds:—

	Months.
Cattley Amethystina	from 11 to 12
„ labiata	13
„ Loddigesi...	10
„ bicolor	10
„ gigas	16
„ Labiata Pescatorei	17
„ Mossiæ	11
„ Percivaliana	10
„ Warneri	10
Lælia purpurata	9 to 10
„ Crispa	11
„ Perrini	18
Laptotes bicolor	12
Oncidium papilio	10
Peristeria elata	8

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Stanhopea oculata	8
Lycaste tetragona	5
Phalænopsis amabilis	6
„ grandiflora aurea	6
„ Schilleriana	5
Odontoglossum vexillarium	8
„ grande	6
Angræcum sesquipedale	7
Cypripedium Chantini	13
Bullerianum	8

"In the case of vigorous well established specimens, seed bearing, as I have many times had occasion to observe, does not act injuriously. This may be seen in the case of plants belonging to various species in my collection which in the present moment are in this condition, but one must be careful not to operate on weakly or imperfectly established plants, or they will be exposed to the risk of perishing, or at the least of losing much of their normal vigour. In this respect Orchids form no exception to the general rule."

ORCHIDS.

[A paper read by Mr. D. Birt before the Caterham Horticultural Society, December 12th.]

It would perhaps be not unfitting to begin the discussion of our subject by giving an answer to the question, "What is an Orchid?" by showing, that is to say, in what respects Orchids differ from other plants. Their chief peculiarity consists by no means in the beauty of their flowers—for many of these flowers would scarcely be thought beautiful—but that which marks off the Orchids from general plant life is the curious structure and wonderful contrivance which their flowers exhibit and which they possess for the accomplishment of a special purpose, which I will explain presently. It is one of these special points of flower structure which has given rise to the term "Orchid," but as I think we can best turn our attention to the flowers of these interesting plants after we have considered one or two other aspects of our subject.

A common idea about these plants is that they all grow in very hot countries, and that they all need very hot quarters when brought under cultivation. The fact is, that though the forests of the torrid regions, and particularly the South American forests, are very rich in Orchids, yet some of those which bear the finest and most interesting flowers are found in climates almost temperate. Orchids, indeed, are found in nearly all parts of the world except the very coldest and most arid, and of the 3,000 species which have been described, thirty-eight are found amongst the wild flowers of Great Britain.

Orchids have two very distinct modes of growth. A large number (the tropical kinds, more especially) grow on the boughs of trees. They appear in no way to injure their big friends who thus hold them aloft, shade them from the fierce sun, and "rock them in their arms so wild." Hence Orchids are not classed with parasitic plants (such, for instance, as Mistletoe), which feed on the juices of the trees they occupy, but are termed epiphytes, which means a plant growing upon a plant. These epiphytes, or tree Orchids, form one of the two divisions of the Orchid family.

The other division consists of the terrestrial Orchids, as those are called which grow down upon the ground.

I will take two or three examples of these groups, first calling attention to the Cattleya. This is one of a large section comprising many sorts differing less in the character of their growth and the shape of their flowers than in the colouring of the latter, which is very various in different species. Though the mode in which it is grown—viz., on the top of a clay pot, with a little peat under it, is found to be the best artificial mode of cultivation, it doubtless grew with far greater vigour high up on its native tree in some Brazilian forest whence it was brought. You must imagine it so growing; in hot sunshine by day modified by the overhanging leafage, at night blown by the cool night winds from the Atlantic, and anon during its growing season drenched by the downpour of a tropical thunderstorm. The base of each leaf (that upon which it grows) is much more than a mere leaf-stalk. It is, in fact, a reservoir of moisture upon which the leaf subsists during the long season of drought to which the plant is exposed. But for this reserve of moisture the plant would die in the hot rainless part of the year, which continues for some months. Due allowance has to be made for this when the plant comes under cultivation, and hence when Cattleyas go to rest after completing their growth for the year we give them scarcely any water. Under this treatment these pseudo-bulbs or reservoirs frequently show signs of shrivelling by partial loss of their contents, but when the growing season comes round again, and water is again given in more abundance, the bulbs get plump again.

We will next take the Odontoglossum, also found on the American Continent, and representative of the class of earth Orchids which are found in great variety in Central America. The particular species I have selected is named O. Alexandræ, because it was introduced to England about the time that our future Queen Consort first came to our shores as the Prince of Wales's bride. This Orchid, though it is a native of Bogota, and therefore as near the equator as many Cattleyas, is found only at high altitudes, and experience consequently a much cooler climate than the Brazilian Cattleyas. Travellers describe it as growing in an almost perpetual mist, the result of which is that it endures very subdued sunlight, a large amount of air moisture, and, as might be expected, found surrounded with mosses and lichens and other moisture loving growths.

The third example is a Dendrobium, of which there is a multitude of varieties. It is an epiphyte. You must imagine this variety, which comes from India, growing in some dense jungle amidst luxuriant vegetation, its long growths not turning upwards as these are trained, but hanging down possibly over a stream of water from some over arching branch. These plump growths are called pseudo-bulbs, and serve the same purpose as the corresponding portion of a Cattleya,—that is as a reserve of moisture for the plant's sustenance during the long rainless season, as in the case of the Cattleya each leaf has its own reservoir. Each pseudo-bulb of the Dendrobium carries many leaves ranged systematically down it. From these bulbs, after the leaves have fallen, charming clusters of flowers emerge. The terrible and the beautiful in nature are often very close to one another, and it may well happen to the traveller as he turns away from the scene of floral beauty, to encounter the gaze of a tiger watching him with not less interest than that with which he has been gazing on the Dendrobiums. Well for his chances of escape if the tiger has not yet completed the digestion of his last victim.

Our fourth plant is a Cypripedium or Lady's-slipper, so called from the slipper-shaped pouch at the base of the flower. This section is the most widely distributed of any Orchids. Varieties of it are found in every quarter of the world, and in England we possess one native variety, *Cypripedium Calceolus*, which is said to be found more especially in the north of England. The Cypripediums have no pseudo-bulbs, because they are not called upon to bear drought. They are found in most places at the foot of trees or protected by moist rocks and stones. The plant I am specially referring to comes from Sylhet and is called *C. insigne*. It may be of interest to contrast the flowers of the ordinary type with those of the superior variety called *C. insigne Maulei* after the firm of Messrs. Maule of Bristol who were fortunate in importing some plants of it many years ago. The upper portion of the flower has a much larger colouring of white than the normal type, and there are besides some handsome purple spots on the same part of the flower which are wanting in the common type.—*Journal of Horticulture.*

BUYING AND SAVING SEEDS.

This subject is beginning to meet with the attention it deserves from the horticultural press. An able writer in one of our contemporaries recently dwelt upon the subject in a very masterly manner. The writer referred to the subject of specialities among seeds, and pressed upon his readers the importance of purchasing their seeds from the original raisers. He did so with a view to show that such a step is likely to promote further efforts on the part of the raiser in other directions, by which means all classes of horticulturists would be benefited. But I am prepared to go further, and to say it is a duty we owe the raiser to go direct to him for our seeds, and I

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have many times proved it is equally advantageous to him to do so. I not only acknowledge that such a step acts as a stimulus to further exertions, but that they have a right to expect that we who are benefited by their labour should support them. If the profits are first shared by the wholesale dealer and then by the retailer, it is very clear that the raiser does not receive the support he ought. It is convenient, I know, sometimes to secure all the seeds we want through one channel, as it means a little less trouble to ourselves. But if we are really interested in horticultural progress, we should sink all these minor matters of personal convenience, and show by our hearty and direct support that the labors of the raisers are appreciated. We who love flowers must be well aware that it cannot be all sunshine with such men. It is not a commercial spirit alone that prompts them, for their labour is often as much a labour of love as it is for the advancement of their own interest, they therefore deserve to be encouraged. There is another matter in connection with this subject that I feel compelled to dwell upon. It is this—that the recommendations of correspondents when they publicly call attention to any particular strain of flowers, are not always received in good faith. Some people appear to distrust any statements made respecting the merits of any particular strain of plants. The proper way to test this question is by weighing the results. If A recommends a certain strain and B purchases, both the purchaser and the vendor are benefited.

In regard to seed saving, I do not hesitate to say that in a general way it is not to be recommended, as it offers no advantage whatever, except it be in the case of one or two choice subjects it may be desirable to maintain. The first argument that tells against seed saving is the fact that any crop from which we require seed must remain longer in the ground than others, so that very often for the sake of a few seeds we should lose the season for getting in another crop Another objection is that owing to the longer time the soil is occupied with the crop, it is more exhausted than it would be if the subjects were used for the table instead of being saved for seed. Those who think that gardeners should save more of their own seeds than they do, should remember that seed saving is a business that requires more than an ordinary degree of care, and that in the case of some things it is absolutely impossible to carry it out in a satisfactory manner for any length of time. I myself, some years ago, thought I was going to be very clever in this matter, but a short experience convinced me that I had made a mistake, for my own saved seeds produced such a number of inferior varieties that I was glad to give up seed-saving. I only attempt to do so in the case of a choice Broccoli or Lettuce which I cannot obtain true elsewhere.

If we sum up the advantages of saving our own seeds, it will be found that reckoning the loss of ground while the crop is maturing, the risk of the birds securing the crop instead of the grower, and the time it takes to harvest and clean the seeds, it will be found that the balance is on the wrong side.—*J. C. C.* in *Gardeners' Magazine.*

THE ROSE.

The Greeks adore the Rose, and the Romans bestowed praises on this flower of the highest antiquity. Anacreon sang its primal birth. Homer praised its form of grace, and borrowed the brilliant colours to paint the glowing richness of the rising sun. Herodotus exulted over the sixty-petaled varieties which grew spontaneously in the gardens of Midas in Macedonia. Catullus vaunted its charms, and Horace admired the "richly tinted face whose bloom is soon fled." Virgil contrasts the pale sallow with the blushing hues, and extols the Roses of Pastum with their "double spring." These costly ornamental gardens, destroyed almost ten centuries ago, no longer shed the morning fragrance of Rose perfume. Nettles and brambles entangle the footpath of the traveller, and as a poetic memory the Cyclamen and the Violet now trail among the debris of the old city. Ausonius, at the very end of Latin literature, draws from the rosaries of Pastum a picture of beauty doomed to premature decline," and watched the luxurious Rose-beds all dewy in the young light of the rising dawn star." Roses bore away the palm from all the flowers during the sovereignty of Augustus and subsequent rulers; but Cicero did not approve of the custom of those who were given to luxurious entertainments of taking their meals reclining on Rose leaves.

Verres, a Roman Governor of Sicily, gave audiences with wreathes of Roses around his neck and upon his head, sitting upon a cushion made of finest Malta linen, full of sweet-scented Rose-buds. Cleopatra and Nero extravagantly decorated their banqueting halls with rosy ornaments and garlands, and distinguished guests were greeted amid roseate bowers, while the merry dance went round in an atmosphere redolent with roseal odours. Every evidence exists that we must connect the Rose with the love of antiquity, for the ancients preserved its luxury, and it was the ornament of its festivals, their altars and their tombs, while their poets made the Rose the symbol of innocence and modesty, of grace and beauty. It is even probable that the Romans had Roses of similar species with some of those we now cultivate, since they practised sowing the seed, as well as propagated by cuttings, by budding and grafting. Hothouse growth was also understood and practised, says Seneca, and it was a boast to have carried to perfection this flower, so far as to surpass the cultivators of Alexandria, Memphis, and Rhodes. That the Rose never tires is shown by its reputation through all ages. A hundred generations have passed attended by revolution of empires and desolating invasions, but time has not detracted from the loveliness of beauty's queen, nor has renewed associates made the Rose less alluring.

Memory bears us up the stream of time, when we are to believe that the Roses in the famous gardens of the East were as pure and constant as now, relics of Eden's bowers, "sweet nurslings of the vernal skies, bathed in soft airs." The same resistless beauty was doubtless manifest, flaunting in the shades of early morn; the same sunshine loved them then, because they were so fair; the same closing and fading of the petals was descried under the dropping of the gloaming dews. In their original clime where the powers of admiration were never exhausted, the Syrian and Musk Rose replete with dewy wine, covered the sacred ground. No frost candied the grass, emblems of life continually existed, and Roses glowed in gem-like tinges, hanging in cataracts from the gray walls of the fortified villages, topped by a crown of foliage. Amid such scenes the traveller exclaimed in admiration, "Who can paint like Nature?" as one beholds this shadowy curtain of gorgeous colours on mouldering stone-work, when the sun goes down behind the amethyst-tinted hills.

In summer time, in our favoured locality, the admirer of the Rose can find refreshment, rest, and peace in this parterre, as he surveys with delight his favorite collection, whose brightness and sweetness bring tender memories, solaces, and hopes; while the reflections awakened by floricultural nomenclature afford new sources for enjoyment. This companionship of distinguished acquaintances attired in rich apparel—the counts and duchesses, princes and barons, queens and empresses, lords and marquises, ladies and airs, madames and mademoiselles, are a royal family, grand and graceful when expanded to fullest beauty of flowers, purple, red, and white, amidst Rose buds, blushing through their bowers of green, more lovely because more concealed.—*Gardeners' Monthly.*

LAYING OUT SMALL GARDENS.

Volumes have been written upon landscape gardening—but we sometimes think that such works are of benefit chiefly to those who need them the least—and that no rules, however explicit, can guide a person in laying out and planting grounds, who has not a natural love of plants and natural taste to assist in their selection and arrangement. The shortest distance between two points—a straight line—is the very best direction for streets or the limits of property; but it ought never to describe the boundaries of sylvan walks, of flower-beds, or of the lawn. Nature abhors straight lines. How beautiful soever may be the trees, shrubs, and flowers, and how skilful soever their display—straight marginal lines give a laboured, artificial look that it is the first aim of the good gardener to conceal. Not to stumble over the post while we avoid the pillar—lines that are too curved are also objectionable. The walk or carriage drive leading to the public road should, of all paths, be the most direct; and in these any curve sufficiently decided to lead one perceptibly out of his way and suggest the wish to "cut across" should be avoided. In by-paths, leading to shady nooks, rockworks, rustic arbours—the curves, if only concealed by foliage so that heirt

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entire outline does not present itself to view, may crook without limit. The impression that we do not know whither we are going, or to what beautiful surprises we are being led by these obscure paths, if ever so faintly produced, is one of the best proofs of taste and skill. Arranging flower-beds, walks, grass-plots, trees, shrubs, mounds, vases, and the like in pairs is another senseless proceeding, as if every object were so unfinished in itself that it must have a counterpart similarly placed to perfect it. But if we adopt the ungeometrical style of gardening, as there are no rectangles that require sentinels stationed in every corner—the family of twins will be likely to receive at the outset "marked coldness." In distributing plants, let us avoid dotting the ground at regular distances, as if it were laid out in squares, and each square were allotted one tree or shrub for its centre and only ornament. The effect is meaningless, and far more distastefully so in the indefinite than in the rectilinear plan, since in the latter it is in accordance with everything else. Groups of trees and shrubs of varying sizes (always proportionate to the extent of the grounds) may be placed here and there, inclining on the whole however, not to obstruct the view from those parts of the dwelling most frequented, and yet so placed as to conceal, except by glimpses, as far as possible, the public road and all boundary lines, so that the actual termination of the ground in all directions is obscured, and one may revel in fancied seclusion. These groups must not however, be planted as if they were one huge tree, but in some instances connected with other groups—while occasionally they may be relieved by lower-growing specimens in the immediate vicinity But of all violations of susceptibility to all that is beautiful—to delicacy of all feeling and good judgment, the introduction of statuary to the grounds about one's home is the most absurd. Bronzed animals, such as deer, dogs—or even lions and panthers—may if placed in thickets or half exposed, be admitted; but white, nude statues of gods, goddesses, or mythical heroes, flaunted out in the broiling sun, or left to freeze and thaw during winter's snows, are painfully inappropriate. Who ever did select his favourite spot near one of them? Their general aspect is not reposeful—and we should select our nook so that many trees and shrubs might intervene to exclude these unhappy, friendless things from view ere we gave ourselves over to balmy, perfumed air,—the deep shadows and the—the other enchantments of summer nights and fair gardens.

In selecting plants, our first thoughts should be about their hardiness, especially if a professional gardener be not employed, and the proprietor is unable or unwilling to give, or is incapable of giving, discriminating attention himself. Trees not perfectly hardy for the locality may thrive for a season or so; but they will be sooner or later killed or so injured as to destroy their beauty. New and alluring Evergreens, whose hardiness has not been thoroughly tested, are often causes of disappointment. We cannot afford to ascertain in the garden by experiment whether trees are hardy or not. It takes too long for them to grow—or rather, too long for others to grow to fill their gap. Arrange flower-beds in a south or south-east exposure. Do not attempt complicated designs, or even angular figures, of any description. Reserve all study upon this subject for the selection of carpets and oil-cloths—wall-paper and frescoing. Make the beds conform to the paths, leaving grassy margins between, always wider than the lawn-mower. If flower-beds are cut out of the turf, it is quite easy to change them from one shape to another—to make them larger or smaller, or to re-turf and construct new ones in different places Unless the ground is naturally rich, we are well rewarded by removing 18 in. of earth, and replacing it with leaf-mould and loam—old manure and sand, in the proportions needed. All should be thoroughly intermixed and leveled smooth, ready to receive the plants. Box and other edgings are very pretty, if well kept—but there is nothing to compare with a clean, velvety turf for margins. The best floral effects are only obtainable when the flower-beds are contiguous. To soften the effect of too much colour, make the tropical bed central, and here display by the use of such plants as the Wigandia, Rheums, Dracæna, Palm, Hibiscus, Catalpa, Agave, Yucca, Aralia, Solanum, Musa, (Ensete), Ficus—colour and foliage that will lend dignity and character to all. An occasional low-growing tree, such as the Crataegus, Pavia, Chionanthus, Rhus, Gleditschia, Cornus, Cercis, Alnus, Magnolia, Salisburia,—or shapely shrubs, as Spiræa, Rhododendron, Azalea, Calycanthus, Cydonia, Hydrangea, Mahonia, would be in keeping. Whatever subjects be selected—whatever plan decided upon for the flower-beds—let us not forget that "everywhere Nature sets her flowers in clouds of refreshing green."—E. S. Carman, in "Moore's Rural New Yorker."

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Editorial Article.

ON WATERING PLANTS.

Some one of high standing in the gardening profession has said that a great number of the gardeners of the present day require the erroneous ideas "pumped out" of them before they can be really useful and clever members of the profession. We will not attempt to discuss this question here, but rather proceed to notice what appears to be, if not an erroneous idea, a practical mistake of the greatest importance to those engaged in plant growing. Probably there is not one who reads these remarks but knows it to be a fundamental principle, both of Animal and Vegetable physiology, that the chief means of supplying food to the system of either is by the agency of water. Just as nothing which is insoluble in water can be taken up by the absorbent system of the animal, so with the vegetable. Everything in the shape of plant food must be first dissolved in water and taken into the cellular tissue in a fluid state, hence the importance of keeping the soil in which the absorbent system or the roots of the plants are, continually in a moist condition. If this simple fact were acted on as a matter of practice by all gardeners there would be a marvellous diminution in the quantity of plants which, if not miserable, are miserable looking. Who does not remember the consumptive appearance especially of pot plants in those places where this starving-for-want-of-water system is carried out. Plants want their meals regularly, but too frequently they are regularly "put off" till they suffer for the want of them; then, when the roots are desiccated, and the spongioles for the time being annihilated, water comes in profusion, but only to make matters worse, for the large quantity required to thoroughly moisten the soil becomes hurtful on account of the roots being unable to perform the functions of absorption, and thus they are treated now with their roots in dust, and anon in puddle. It appears, in our estimation, one of the grossest errors horticultural writers fall into—the continually advising of carefulness in watering, and being sure not to water plants till they are dry. This teaching is in direct opposition to that of nature. The rain does not wait till the earth is dried before saturating it; nothing of the sort: any one can find out this for himself by examining the soil at regular intervals during the year, and excepting during extreme dry weather, no great depth need be gone to before finding moist soil. It used to be the most troublesome question we had to solve in former days, when on looking over our plants there were those which though not dry, yet were not wet, and the fear of doing something terrible in its consequences debarred the plants from receiving the water they required, till drooping leaves caused a double quick rush after the watering pot. We feel no fear now, when we come across a plant in this condition of moisture, to supply it with water. We don't like to see the soil get dry before watering; and with a plant in growth, with heat, air,

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and light, the dread of killing it with too much water may be dispensed with, to the advantage both of plant and cultivator. Of course it is quite easy to give too much ; but judgment and a little experience will be the best guide to the time when water ought to be given. Generally speaking, when the particles of soil are in a state of non-cohesion, no harm will accrue from giving water, even though the plant does not seem to require it, only water ought to be withheld till the same non-cohesive property is noticed in the soil. Plants watered thus never suffer a check from want of water. We know perfectly well that plants extract moisture from the soil when to all appearance there is none in it ; but this is only a power for the preservation of life common to animals as well as plants. No one will say that it is impossible for animal life to be preserved for days without food, but as little will any one say that such a state is conducive to healthiness. It is just the same in the case of plants : allowing them to become dry deprives them of the means whereby they procure sustenance ; and though not killed, if this style of watering is persisted in the penalty will be stunted plants and flowers, beside an unlimited host of insect pests to keep under and a larger quantity of water required to moisten the soil besides what escapes between the shrunken ball and the pot. The quantity of water required at one time for a plant is well worthy of attention. When the soil is constantly kept moist, it will be found that very little is needed to thoroughly wet it. Any more is prejudicial, inasmuch as every drop of water that drains through the bottom of the pot has dissolved its share of the goodness of the soil and carries it with it.

As to the *rationale* of supplying plants with manure-water, we always consider it full time to use it when a plant has well nigh used up the soil in the pot in which it is intended for flowering or permanent growth. In the case of flowering plants, such as the Camellia, a great many gardeners abstain from using it till the buds are set, and then supply it to the plant one, two, or three times a week. Why it should not be used for watering every time the plants require it is not very clear to us. Giving weak liquid manure-water continually when the soil is exhausted, appears, to say the least of it, a more reasonable mode of using it than the plan of using it stronger and only occasionally. Some people make a point of faring almost sumptuously on Sundays, and going on "short commons" during the remainder of the week ; and giving manure-water in this manner bears some resemblance to it. We know that the plant will not use more in one day than is sufficient for its wants, leaving the remainder for future use; still, little and often we believe to be best. Our ideas on this part of the subject are, give manure-water as soon as a plant has filled its pots with roots ; give it every time water is required, taking care that it is very weak at first, though it ought to be of a stronger nature as the roots increase in quantity and the plant in size. Treated thus, there is a certainty of giving enough food; but as the buds expand and the flowers develop feeding ought to be dispensed with and water, pure and simple, used.

We hope it will be understood that these remarks do not apply to Orchidaceous or Cryptogamous Plants, nor to any species whose natural habitat is a dry one at root.

—*Gardener.*

Editorial Notes.

PICKLING ONIONS.—The *New York Tribune* states that the aggregate length of the Onion rows on a pickle farm near Chicago is 320 miles !

THE SOYA BEAN.—According to an analysis published in the *Bulletin of the Central Horticultural Society of France* the seeds of this plant, Soya hispida, are considerably richer in nitrogenous and fatty matters than any other pulse.

THE LARGEST VINE IN THE WORLD is said to be one growing at Oys (Portugal), which has been in bearing since 1802. Its maximum yield was in 1864, in which year it produced a sufficient quantity of Grapes to make 750 litres (165 gals.) of wine ; in 1874, 665 litres (146¼ gals.); and in 1884, only 360 litres (79¼ gals.). It covers an area of 494 square metres (5,315 sq. ft.), and the stem at the base measures two metres in circumference. —*Society of Arts Journal.*

FLOWERS FOR PERFUMING TEA.—A Chinese "Materia Medica" affords some information regarding the flowers used for perfuming Tea. The principal ones appear to be those of Gardenia radicans, Jasminum Sambac, Aglaia odorata, Ternstræmia japonica, Camellia Sassanqua, and Olea fragrans ; those of the last-named shrub being especially esteemed for the purpose. The leaves of Salix alba, and many other species of Willow, are employed in making a kind of Tien-cha, and are said to be openly mixed with the Tea intended for exportation at the Chinese ports.

THE QUESTION OF NAMES.—We notice that the *American Naturalist*, a periodical written by the ablest scientific men, makes a much-needed remark on the question of scientific names. In reviewing a first book of zoology, by Professor Morse, it says ; —"The objects are called by their common names. The author has had the good sense to omit the scientific names, thus rendering the book vastly more attractive and useful. Many readers are anxious to first learn the Latin names, and are too often content to stop there. The scientific name is a thing of the least importance." There is no doubt that the progress of knowledge in plants, too, has been sadly impeded by presenting beginners with a number of hard words at first.

MOUNT RORAIMA.—Mr. Everard im Thurn, at the late meeting of the British Association, stated that Mount Roraima was situated, not in British Guiana, but just outside, in Brazil. In height the mountain was a mere dwarf, as its summit was only between 8,000 ft. and 9,000 ft. above the level of the plain from which it rose. To have some conception of Roraima they must imagine a flat-topped pillar, itself some 2,500 ft. in height, set on a very steeply sloping truncated cone of about another 2,500 ft. in height. Moreover, the sloping base on which the pillar-like portion of Roraima stood was over the greater part of its surface rendered but barely passable by reason of a complete covering of boulders and rocks, such as presented the appearance of an enormous and magnificent moraine ; and it was obscured and rendered yet more impassable by one of the densest and most tangled forests to be found even in the tropics.

MEASUREMENTS OF AN ACRE, &c.—The following will be found useful in arriving at accuracy in estimating the amount of land in different pieces of ground under cultivation :—5 yards wide by 968 yards long contain one acre ; as do also the following measurements :—10 yards wide by 484 yards long ; 20 yards wide by 242 yards long ; 40 yards wide by 121 yards long ; 80 yards wide by 60½ yards long ; 70 yards wide by 69¼ yards long ; 60 ft. wide

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by 726 ft. long ; 100 ft. wide by 369 ft. long ; 120 ft. wide by 563 ft. long ; 220 ft. wide by 198 ft. long ; 240 ft. wide by 181½ ft. long ; and 440 ft. wide by 99 ft. long. A box 24 in. by 16 in., 22 in. deep, contains one barrel ; a box 16 in. by 16½ in., 8 in. deep, contains one bushel ; a box 8½ in. by 8½ in., 8 in. deep, contains one peck ; a box 4 in. by 4 in., 4½ in. deep, contains a quart.

Potatoes in Germany.—An interesting paper was lately read at a meeting of the Saxon Economical Society in Dresden, giving an account of the introduction of the Potato into Germany and the gradual spread of its cultivation. In 1585 it was first brought into Germany from Italy. The first seed Potatoes in Saxony were a present in 1591 from the Landgrave of Hesse to the Elector of Saxony. In 1647 they were grown as exotics in gardens at Leipzig. Swedish soldiers brought them into Western Germany about the conclusion of the Thirty Years' War. In 1717 they were re-introduced into Saxony from Brabant, and within twenty-five years they began to be regularly cultivated, their use being much developed in the famine period of 1770-71. In the year 1882 over 9,000,000 acres were given up to the cultivation of Potatoes in Germany, the produce amounting to 23,000,000 tons.

Large tracts of land in the south of France, not hitherto cultivated, are being planted with the kind of oak trees beneath which Truffles are generally found, and it is expected that each acre of this land, lately sold as low as £5, will yield a crop of Truffles worth £20 per year. The experiment has been tried in the department of the Vaucluse, and in the course of the last twenty years, 150,000 acres, which were absolutely unproductive, have been planted, and are yielding a rich return. The cost of plantation, which is borne by the Commune, does not exceed 17s. per acre on hilly ground, and though rather greater in the lowlands, the crops are proportionately heavier. Acorns only are planted on the hilly ground, but saplings of five or six years' growth, placed in rows about 40 feet apart, are found to answer best in the lowlands. The ground between the rows is planted with Vines, which, after five or six years, repay the cost of the plantation and its culture.

We see that it is announced that Mr. John M. Cook, the managing partner of Messrs. Thos. Cook and Sons, has come to India especially to make arrangements for a large number of Rajahs, Native nobility, and gentry who intend visiting London during the Indian and Colonial Exhibition, 1886. Mr. Cook's achievements as a tourist agent are too well known to need comment, and we have no doubt that under his direction the present scheme will be brought to an equally successful issue. To a casual observer it may seem a matter of very little difficulty to arrange the details of such an undertaking, but those who are well acquainted with the mysteries of Indian Court Life, and the peculiar caste prejudices that exist throughout the Empire, will be better able to understand the herculean nature of the work now undertaken. We observe that Messrs. Thos. Cook and Sons are arranging for Visitors from India to have their letters and telegrams addressed to their office in the Exhibition, and also to have the free use of their reading and writing rooms at their office in Old London Street in the Exhibition. Their Code Address will be "Tourist London."

Evergreen and Deciduous.—Than this no division is better understood. He would be a bold man who ventures to throw a doubt on the fact that trees and shrubs are either evergreen or deciduous ; but it may have escaped the notice even of naturalists that the division is not quite perfect, and for this reason that, although no deciduous tree (as generally understood) is evergreen, yet some evergreens are deciduous Indeed, by far the greater number of them shed their old leaves as the new ones take their places, as any one may observe at this time of year by looking at the ground under a Holly, an evergreen Oak, or most of the Pine trees. This rule is so general, that it need not be remarked on if it were not for the fact that some evergreens are not deciduous. My attention was first drawn to this fact by observing the Araucaria imbricata, whose spikes never drop off, but appear to be gradually absorbed into the stem, and if they be forcibly removed Nature does not replace them. I have gone on to observe that the same rule applies to Wellingtonia and to all the Arbor-vitæ tribe, and, as far as I can see, also to other Conifers, such as Picea nobilis, but I would request some better informed observer to give us the benefit of his knowledge on the subject.—I. T. in *The Garden*.

Garden Fences.—The English and Americans seem to have an insane love for fences. We fence the roads from the farms, and then divide the farms into little apartments, like enlarged checker-boards. We fence our villags and city lots, and even disfigure our cemeteries by costly and unsightly fences. Every owner of a little lot in the City of the Dead must fence his 20 square ft. of property, but whether for the benefit of the living or the dead is not clear. The English carry this folly to a still greater extreme, and most of the costly mansions with their elegant grounds, in the vicinity of London, and, in fact, everywhere, are surrounded by brick or stone walls, from 6 ft or 8 ft. in height, and even these are sometimes surmounted by broken bottles, or something of the kind, to make a passage over them dangerous, if not impossible. The front gates, too, are solid and massive, and anyone desiring admission must ring the bell or go "tapping at the garden gate." The English law maxim, that "Every man's house is his castle," seems to be fully believed by the people, and many residences look as though they might endure a formidable siege. The people of this country have begun at last to realise the folly of spending such vast amounts of money, not only uselessly, but to the actual injury of their property, both in appearance and productiveness. Farmers are using fewer fences, while in many of the finest places in the neighbourhood of our large cities front fences, and even division fences, have been mainly discarded. An objection is that the destruction of fences destroys all privacy. This is in a measure true, but we have not yet seen the person who considered this is a serious objection, or who would be willing to restore the fences when once removed. Some are apt to think that passers-by will take unwarranted liberties, pick flowers, &c.; but this is not so. Remove your fences, place confidence in the people, and you put them on their good behaviour. Nothing will be harmed. We have in our mind a place near this city, planted with shade trees. Three years ago it was divided into three lots with hedges and fences, now all are removed, and we know of no prettier piece of lawn in the world.—*Vick's Magazine*.

Single *v.* Double Flowers.—Is not the present prevalent fancy for single flowers of plants that produce double ones less a protest against the change produced in the structure of the flower by florists, and rather a sort of floral sentiment that for the moment holds sway ? In taste for flowers, as for many other things, we are held in a sort of fashionable chain. Let the excited fancy take flight after brilliant bedding displays, then the popular fancy follows. So also does it in the case of carpet bedding ; then it swerves off to a dance after hardy plants, and then from double to single flowers, and so on. Probably we shall be told that this indicates, not an eccentricity of mind, that is proverbial amongst the masses, but rather a reversion from feverish fancies back to a healthy state of mind ; but all who watch the waves of fancy which flow through the world will have to admit that none have stability, and another will soon succeed the previous one, obliterating that and all its impressions. The present taste for gawky single flowers of certain kinds is retrogressive. It naturally conducts back to the garment of Fig leaves and all its very primitive associations. Does any sane person prefer the Dog Rose to a La France, a Devoniensis, or a Marechal Niel ?—a single Pæony to a double one, or single Stocks, Carnations, Asters, Balsams, Marigolds, ay, or scores of similar things, to double ones ? Single Dahlias and single Pyrethrums are re-introduced as protests against the inevitable doubling of those flowers, but what are they more than coloured Ox-eye Daisies ?—big, staring yellow eyes that are coarse and monotonous, surrounded by single rows of thin loose petals. These serve very well to reproduce their

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kind, but of real floral beauties they have little. There was a certain feverish scream raised when Mr. Gannell brought up his single Dahlia blooms, but curiously enough no sooner does he follow with the semi-double Juarezii than the scream becomes a perfect yell of delight at the manifest advance shown. That was inevitable. No lover of flowers is content to stand still. If any kinds soon pall upon the floral palate surely it is thin bodiless single ones, of which we have double ones so infinitely superior. There are plenty of single flowers so beautiful that we do not want them doubled, but if gawky single flowers can be improved by human skill, let human skill do its best by all means.

—*Gardeners' Chronicle*

Original Articles.

THE ROSE.

The Bourbon Rose.

This, which, but a few years since, comprised one of the most important groups in the Rose family, has been almost entirely superseded by the Hybrid-perpetuals, Teas, and the numerous other classes of Roses that have sprung into existence, and which by their gorgeous colours, immense size, fine form, or delicate beauty, have enslaved all the affections of nearly every Rosegrower, to the almost total extinction of old friends tried and true. Take, for instance, the parent of the whole group, Rose Edouard. This was introduced in 1822, and for very many years was the only Rose of any value or beauty in this country, and even up to the present day we have not a single variety that equals it in its profuseness of bloom. It is a strange fact that it has retained the name of Rose Edouard in this country, as in Europe it has always been known under the name given it by its French introducer, namely, Rose de l'Ile de Bourbon. Probably it may have been introduced to India direct from Bourbon, where it is stated it originally bore the name by which it is best known to us.

Rivers, in his Rose Amateur's Guide, gives the following interesting history of this Rose:—

"It is now, perhaps, about fifty years since that a beautiful semi-double Rose, with brilliant rose-coloured flowers, prominent buds, and nearly evergreen foliage, made its appearance in this country, under the name of l'Ile de Bourbon Rose, said to have been imported from the Mauritius in 1822 by M. Noisette. It attracted attention by its peculiar habit, but more particularly by its abundant autumnal flowering; still such was the lukewarmness of English Rose amateurs that no attempts were made to improve this pretty, imperfect Rose, by raising seedlings from it, though it bore seed in large quantities. This pleasing task has been left to our rose-loving neighbours, the French, who have been very industrious, and, as a matter of course, have originated some very beautiful and striking varieties, and also, as is usual in such cases, have given us rather too many distinct and fine sounding names attached to flowers without distinctive characters. Many fables have been told by the French respecting the origin of this Rose. The most generally received version of one of them is, that a French naval officer was requested by the widow of a Monsieur Edouard residing in the island to find, on his voyage to India, some rare Rose, and that, on his return to the Isle of Bourbon, he brought with him this Rose which she planted on her husband's grave; it was then called Rose Edouard, and sent to France as "Rose de l'Ile de Bourbon." This is pretty enough, but entirely devoid of truth. Monsieur Breon, a French botanist, gives the following account, for the truth of which he vouches. At the Isle of Bourbon the inhabitants generally enclose their land with hedges made of two rows of Roses—one row of the common China Rose, the other of the red four-seasons. Monsieur Perichon, a proprietor at Saint Benoist in the Isle, in planting one of these hedges, found amongst his young plants one very different from the others in its shoots and foliage. This induced him to plant it in his garden; it flowered the following year, and, as he anticipated, proved to be of quite a new race, and differing much from the above two Roses, *which at that time were the only sorts known in the island.* Monsieur Breon arrived at Bourbon in 1817 as botanical collector for the Government of France, and curator of the Botanical and Neutralisation Garden there. He propagated this Rose very largely and sent plants and seeds of it, in 1822, to France. M. Breon named it "Rose de l'Ile de Bourbon;" and is convinced that it is a hybrid from one of the above Roses and a native of the island. Probably in this country the Bourbon are the most easily grown of all Roses, and require but little care and attention as compared with most of the other groups, though of course, like every thing else in the vegetable kingdom, the more we strive to understand and comply with their requirements the more surely will they give us an ample return for our labours. The whole of the family are free and constant bloomers, with fine foliage, bright colours and in general finely-shaped flowers. They vary very much in habit, many varieties being dwarf and compact, others of moderate growth, and some very vigorous and robust. The smaller growing kinds require to be pruned rather closely, and the more vigorous rather sparingly, as if these are cut too hard they will produce too much wood at the sacrifice of the flowers.

List of Bourbon Roses.

Name.	Description.	Habit of Growth.
Acidalie	Blush white; in dry weather beautifully tinted; large and full	vig.
Apolline	Flowers light pink; a very fine rose	vig.
Baronne de Noirmont	Fresh rosy pink, petals of good substance; flowers large, full and well formed, possessing a delicious violet scent	rob.
Baronne Gonella	Bright cerise, with fine brouse hue; large and full	vig.
Catherine Guillot	Carmine rose; flowers large, well formed and full: a superb rose	vig.
Dr. Berthet	Brilliant cherry red, large, full, and good	rob.
George Peabody	Purplish crimson, finely cupped, large and full	vig.
Jules Jurgensen	Rose magenta, velvety carmine with slaty reflex in the centre, very large, full and well formed	vig.
Louis Margottin	Satin rose, large, and full	free.
Louise Odier	Rosy pink, full and finely formed; a good growing and beautiful rose	vig.
Madame de Sevigne	Very bright rose in the centre; borders of the petals lighter; large and full; blooms in clusters.	vig.
Madame Joseph Guyet	Rich violet crimson; petals smooth and shell shaped	free.
Madame Marechal	Flesh colour, edged with white; very distinct	vig.
Madame Scipion	Very bright rose, large, cupped and finely formed	vig.
Marie Pare	Flesh colour with deeper centre; of medium size, full and of good form and habit	vig.
Marquis Balbiano	Deep rose, tinged with silver; very full, of medium size; a good old rose	vig.
Michal Bonnet	Fresh rose; flowers large, full and well-formed; a good rose	vig.
Modele de Perfection	Pale satin pink, fading off to a beautiful carmine tint	dwf.
Perle D'Angers	Very pale rose, almost white, large and full, finely imbricated	vig.
Queen	Clear buff rose, large and full; a very free bloomer	free.
Queen of Bedders	Deep bright crimson flowers; remarkably free flowering, produced in clusters	free.
Reine Victoria	Soft delicate rose of medium size	vig.
Sir J. Paxton	Bright rose, shaded crimson; free blooming	mod.
Souvenir de la Malmaison	Blush, centre flesh, fine foliage and habit; one of the best roses grown	free.
Souvenir de la Malmaison a fleur rouge	A variety of the preceding, but with flowers of a clear shade of pink	free.
Victor Emmanuel	Purple and purplish maroon, large and double, good and distinct	vig.

Bourbon and Noisette Perpetuals.

The varieties comprised in this group are occasionally classed with the hybrid perpetuals. Most of them are very free bloomers; the flowers are not large, but are well formed and generally produced in clusters.

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Name.	Description.	Habit of Growth.
Roule de Niege	Pure white, petals of great substance, medium size, fine form; one of the best	vig.
Comtesse Barbantine	Flesh colour, large, full and of good form	vig.
Coquettes des Alpes	White, centre shaded with rose; full, fine form	rob.
Coquettes des Blanche	Pure white globular flower; very large	
Louise Darzeus	Pure white, not large, but full and of good form	mod.
Madame Auguste Perrin	Pale rose; reverse of petals whitish, of medium size; a beautiful and distinct rose	vig.
Madame Gustave Bonnet	White, shaded with rose and carmine, medium size, globular form; very free bloomer	free.
Madame Scipion Cochet	Beautiful bright rose; edge of petals silvery; fine imbricated flowers	vig.
Olga Marix	White, shaded with salmon; medium size	
Perfection des Blanches	Pure white, of medium size, full and of good shape	mod.
Perle des Blanches	Pure white, rather small but very free bloomer	mod.

China Roses.

These are also known in Europe as Bengal Roses, the parent of the whole race being *Rosa indica*, a native of China. They are all dwarf and compact in habit, and are admirably adapted for cultivation in this country, where they thrive most vigorously, are easily propagated by cuttings, and bloom more profusely than any other class of Roses. Of course we cannot claim for them the great diversity of form and colour found in the hybrid perpetual, or the delicate shades of colour, or the delicious fragrance of the Teas, still this is to a great extent compensated for by their continuity of bloom, their distinct form and colors, their hardiness and immunity from all the diseases and ills that rose-flesh is heir to. This hardiness and immunity from disease is no doubt principally due to the fact that they are almost invariably descended from one original species without having been crossed and inter-crossed with other types. The following is a list of the best varieties in this class:—

Name	Description	Habit of growth.
Abbe Miland.	Reddish purple, often streaked with white; large and globular	
Archduke Charles	Pale rose, changing to deep crimson, very large and double (generally known in this country as *Rosa Indicolor*)	free.
Belle de Florence	Pale cherry, medium size, semi-double, produced in clusters	mod.
Clara Sylvian	Pure white, rather thin petals, very pretty.	
Cramoise Superieure	Flowers large, very double, rich glowing crimson; one of the most brilliant coloured roses in cultivation	mod.
Ducher.	Pure white, medium size, fine form, full, very free flowering	free.
Eugene Beau harnais	Small, beautiful bright amaranth, perfect in bud, when about half expanded	dwf.
Louise Phillipe	Dark crimson, edges of centre petals almost white, of medium size, very double	mod.
Madame Breon	Brilliant rich rose, colour tinged with salmon, large and full	free.
Marjoline.	Bright vivid crimson	vig.
Mrs. Bosanquet	Beautiful delicate waxy white, very free blooming, one of the finest roses we have. (This is occasionally classed amongst the Bourbons)	free.
Napoleon.	Bright pink, very fine, large and double,	mod.
Sanguinea.	Small, very double	dwf.
Viridiflora.	Flowers bright green, more curious than beautiful.	free.

Rosa Lawrenceana (Fairy Rose.)

This is frequently classed with the preceding, though by most botanists it is considered to be a distinct species. This is best grown as a pot plant, and under favourable conditions produces its pretty daisy-like pink flowers in great profusion throughout the year. There seem to be two distinct varieties of this plant, the flowers of both being of the same colour, one, however, being about double the size of the other.

Rosa microphylla.

This is frequently called the Indian Moss Rose, owing to the deep-green prickly calyx that surrounds the buds, easily recognised by its distinct, dense minute foliage; flowers very double, of good shape and medium size; outer petals pale pink; centre deep carmine. There is also a single white and a single crimson variety in cultivation in Europe, but we have never met with them in this country.

Rosa Lyellii (Rose of the Doon).

A very vigorous growing species, bearing large, double, pale pink or blush flowers; grows and blooms freely in Oudh and the N. W. Provinces, but cannot be induced to do so anywhere in the vicinity of Calcutta.

THE DAHLIA.

There is probably no plant in cultivation that has been more buffeted about by the vagaries of fashion than the Dahlia—at one time almost rivalling the Rose in public estimation, after a brief period of popularity sinking into comparative obscurity, and again when some other favourite for which it had to make room has been discarded, perhaps rising to a more pre-eminent position than it had previously attained. The most startling revolution, however, that has taken place in the Dahlia family is the re-introduction of single varieties into cultivation, and more astonishing still is the immense degree of popularity to which they have attained. After half a century or more had been spent by many of the leading florists in Europe in endeavouring to bring the Dahlia to the highest state of perfection, filling the flowers so full of petals that it would be almost impossible to fill them fuller, by a sudden stroke of fashion's fairy wand all this work is undone, and we are brought back to the point from which our forefathers started at the commencement of the present century, and it is a strange fact that one of the most popular types of single Dahlias now in cultivation is an exact counterpart of one of the two original species from which all our cultivated varieties have descended. No one can deny that single Dahlias are extremely beautiful, but, on the other hand, even their most enthusiastic admirers would not care to assert that they in any way eclipse the double varieties; and there is no doubt that the latter will remain *primus inter pares* long after the single varieties have again sunk into oblivion.

The following interesting particulars regarding the early history of the Dahlia is given in Fish's "Bulb Culture":—

"We know comparatively little of the early history of the Dahlia, our first record of it being in a "History of Mexico" by Hernandez, published in 1651, who described and figured two separate species of Dahlias. A French diplomatist, who was sent to Mexico by his Government to possess himself by some means of the invaluable cochineal insect for the enrichment of his own country, also noticed the Dahlia growing on the elevated sandy plains of Mexico. A century seems to have elapsed between the first recorded notice of the Dahlia and its being sent from the Botanic Gardens of Mexico to those of Madrid by Cervantes, the Spanish Director of the former, in 1789. In the following year it seems to have flowered there, and attracted the attention of the Abbe Cavanilles, who, as far as is known, was the first to give a scientific description of the plant, and re-christened it Dahl or Dahlia after his friend Andrew Dahl, the Swedish botanist. The Marchioness of Bute introduced it in 1789 into England, and Lady Holland procured fresh seeds in 1804 when the original stock had perished through ignorance or neglect, and the first plant flowered in 1805. The seeds ripened, and were distributed in 1806; and these may therefore be looked upon as the progenitors of our present race of English Dahlias. The Abbe Cavanilles, inspired with a laudable anxiety to allow the Dahlia to speak for itself, rather than through Hernandez's figures and descriptions, sent roots of the three varieties then (1802) known in Spain to the Jardin des Plantes in Paris. These were successfully cultivated and speedily improved. Two years later, in 1804, Humboldt visited Mexico, and found the Dahlia growing in plenty in sandy meadows at an elevation of 5,000 ft. above the level of the sea. From these he collected seeds and forwarded them to Paris and Berlin. And no doubt the plants raised from Humboldt's seeds, intercrossed with the three varieties

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already in Paris, were the direct progenitors of our present race of Dahlias.

Whether from the stimulus afforded by the introduction of these varieties, or the new seeds, is uncertain, but the fact is obvious, both the French and the Germans made far more progress in the culture of the Dahlia in these early times than the English. The first double Dahlia appeared in Berlin in 1809, but it was many years after before the double varieties became common. During the great Napoleonic wars the French seem to have found time to improve their Dahlias, so that when the English flocked to Paris after the peace of 1815 they were astonished and delighted with the French Dahlias, and large quantities of the best and most expensive of them speedily found their way to England.

Since that time Great Britain may be said to have led the van in the improvement and the culture of the Dahlia. The revolution of taste in regard to Dahlias that has occurred several times since their introduction is very remarkable. First they were received very coldly apparently in 1789; then with enthusiasm in 1815, which reached fever heat probably between 1830 and 1840; then they advanced and retreated in a series of uncertain and apparently capricious ebbs and flows; now again growing in intensity."

Botanically the Dahlia belongs to the great Aster or *compositæ* family, which includes about nine thousand species, and is scattered over the greater portion of the earth; and yet the family is not very rich in decorative or useful plants for the garden. We are, however, indebted to it for such well known garden plants as lettuces, endive, chives, scorzonera, salsify and artichokes. The aster zinnia, calendula, tagetes, chrysanthemum and Dahlia are the most useful and ornamental examples of this immense order. The general colour of the order is yellow, and yet, strange to say, we can hardly yet be said to have a good yellow aster, the reds and purples so common among asters, and also scarlet, so prevalent in Dahlias, are comparatively rare colours throughout the families or species of *compositæ*. This order is distinguished by the arrangement of the florets in involucated heads and the cohesion of the antheræ of the flowers. On examining the disc florets of a single daisy, chrysanthemum or Dahlia, it will be seen that the five anthers are joined together at their margins so as to form a tube, and the style is concealed below these anthers until the pollen is ripe enough to be discharged. Just at this critical period the style rises through the tube, its two sides however being firmly pressed together so as to prevent any pollen lodging on the stigma. To prevent self-fertilisation the top of the style is not only closed, but also covered with stout strong hairs for the purpose of brushing the pollen out of the anther cells and carrying it or placing it where winds or insects may convey it to the outer and older flowers nearer the margin of the same disc which are thus fertilised by the newly shed pollen. The stigmas which have thus helped to fructify the older flowers are in turn fertilised in the same way by the next flowers that open nearer to the centre of the disc. In other species of this order the sexual organs of the same flowers are developed unequally, so that no flower is fertilised by itself.

These facts have a most important bearing on the improvement of the Dahlia, for though the plant is hermaphrodite, and the different organs of the flower placed side by side, yet practically they become monœcious, which renders intercrossing and hybridising easy. The flower of the Dahlia, as is well known, varies almost to infinitude in size and colour. Of late years a new race of pompon or bouquet varieties has been selected, with flowers little if at all larger than pyrethrums. Dwarf or bedding strains have also been chosen varying in height from 1 ft. to 18 inch to 2 ft. The different species and varieties range from 3 ft. to 10 ft., or even 15 or 20 ft. in the case of *D. imperialis*. The habit and general character of the Dahlia is so well known as to need little or no description. Left to itself it forms a dense bush about 4 ft. high and 2 ft. through. Each species, and almost every variety, has, however, its own peculiarities of style, height and habit. A new species or very marked variety—*D. gracilis*—has been recently introduced with much finer divided and minutely cut foliage. Could the bouquet Dahlias, which are mostly very tall, apparently trying to make up in height what they lose in size of bloom, be reduced to a foot, and the coarse leaves of others be more finely cut and divided after the manner of *D. gracilis*, the Dahlia would become much more useful and popular as a decorative plant.

The roots are tuberous and fasciculated, the stems herbaceous, hollow and deciduous; the hollowness of the stems needs to be borne in mind, as it is often the cause of many roots perishing by being stored in a wet state or full of sap; the fluid cannot escape, but sinks down through the hollow stem into the tuber, and causes the latter to rot. Though Dahlia roots are by no means tempting, they are edible; but very few care to repeat the experiment of eating them, neither are they credited with any medicinal properties.

(*To be continued.*)

EVILS ATTENDING PLANT CULTURE IN POTS.

This is a good time to give advice on this subject. It is not a good plan to grow any plant in a pot; but pot culture is a necessity of horticulture, and as all gardeners, great or small, grow an immense proportion of their stock in pots for a shorter or longer season every year, it follows that they should know all they can about pot culture and its evils. Gardeners, and especially amateurs, are so much accustomed to growing plants in pots, that we dare say that the idea is a common one, that it is the best way to grow them. It is not the best way however, and except under a few exceptional circumstances, it is the worst way. Very many of the ills which afflict plants are directly or indirectly traceable to their culture in pots. It is an acknowledged fact that green-fly, thrip, red spider, mildew and not a few other pests and diseases which attack plants, are encouraged and aggravated by culture in pots. How is this? some one will ask; and in answer it may be said that the idea is not a new one, or broached for the first time. Lindley gave the subject his attention, and so did Knight; and inventors have devised pots that were said to overcome or mitigate the evils complained of, but owing either to the price or inconvenience of using such articles, they have never become popular, and for mostly all purposes the common flower pot is still in general use.

One of the greatest disadvantages connected with the use of pots is the necessity of standing them in places exposed to the air and sun, and the great fluctuations of temperature and moisture to which the roots of the plants growing in them are exposed. It is very bad for any plant to have its roots in a medium that is liable to be alternately wet and dry, or cold and warm, and these are just the conditions to which pots expose them; hence experienced gardeners are always casting about for some means of protecting the pots, and resort to plunging, shading, sprinkling paths, and various other devices so as to prevent these agencies working mischief as much as possible. When a plant is newly potted in abundance of soil, and freely watered, the roots are not so much affected; but when they reach the sides of the pots, which they soon do, and there is nothing between them and the sun and air but about an eighth of an inch of porous earthenware, they are liable to serious injury if not watched attentively. When the soil becomes parched in the pots it shrinks away from the sides, leaving a space between the two; active evaporation begins from the tender roots, which instead of absorbing moisture, as is their function, part with it, and the consequence is that they are either killed or injured, and the branches suffer in proportion. Where large collections of plants exist, or where those in charge have not time to attend to the wants of the plants, this is quite a common occurrence at this season, and many a plant is irretrievably ruined thereby. Regular attention to watering and shading can only prevent such things happening; and in the case of pot-bound plants a good deal of attention is required, because the soil in the pot soon dries up. To fully understand the condition of a plant situated in a pot as described, it must be remembered that in the natural state when a plant grows in the ground, the roots have unlimited scope, and do not experience such conditions at all; whereas in a pot exposed on all sides, evaporation is constantly going on from the roots, the porous earthenware pot acting like a wet cloth put round a bottle of water to keep it cool. As regards temperature, the roots of all plants are naturally subjected to far more uniform conditions than

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the tops, that is to say the temperature of the ground does not vary nearly so much as that of the air, and it is found that the nearer these conditions are imitated in artificial culture the better do plants thrive.

The remedies for the drawbacks of pot-culture are various. Many kinds of plants have of necessity to be grown on stages and shelves in glass houses where they cannot be plunged, and the cultivator must then do the best he can under the circumstances The main point to attend to in such cases is not to water the plants during the driest and warmest time of the day when evaporation is most active, but say in the morning or in the evening. Plants standing with their pots touching each other thrive much better than when the pots are placed widely asunder, and hence close ranking should be the rule, provided the tops have room at the same time. Under other circumstances the best plan is to plunge the pots up to the rim, whenever possible or convenient. Plunging obviates many evils, and it is often a good practice to plunge the pots of favorite subjects in another and larger pot, filling up the space between the sides with ashes or soil. Double-sided pots have been made to meet this end, but they are too cumbersome for general use. A dry cloth or a piece of stout brown paper tied round a pot, answer almost as well. The object in any case is to prevent radiation and evaporation, or the escape of heat and moisture from the soil in the pot, and so preserve the roots in an agreeable medium.—*Field*.

WATER BOUQUETS.

The above heading will no doubt seem a peculiar one to those who are not acquainted with the interesting method of preserving cut flowers by completely inmersing them in water. The process is extremely simple, and with ordinary care (combined of course with good taste in arrangement) success is so certain that we feel assured that those of our readers who carefully carry out the following instructions, given by one of our English contemporaries on the subject, will be highly gratified by the result.

These are ordinary bouquets preserved in water from which the air is excluded, and which keep fresh and beautiful for periods of a week or a fortnight, or even three weeks, according to the character of the flowers or foliage used, the care with which they are made, and the purity of the water employed. Water bouquets, formed chiefly of Ferns and other foliage, such as Crotons for example, so rich in colouring, and so diverse in form, may be preserved in perfection for a month or more. The beauty of each leaf and sprig is also displayed to the utmost perfection in water bouquets. There is no huddling of the flowers or foliage into masses, on the contrary, each branchlet, leaf, or flower may be allowed to float gracefully in the water while seen throughout its entire length in all its natural beauty. This extreme grace and lightness form one of the chief charms of water bouquets. But, it may be asked, how are they made? Thus:—Take a shell, a piece of coral, a flint, or other stone, or bit of metal—the two first are the best—and construct a bouquet of any handy size upon or around it, securing, however, all the materials of the bouquet to whichever one of these substances may be used. The weight of the coral, shell, or stone, should be sufficient to hold the bouquet in one position in the water; if coral be used, it adds to the beauty of the bouquet to allow part of it to be seen through and among the flowers; if stones or other weights be employed, they may readily be hidden with the flowers or foliage of the bouquet. A piece of lead drilled full of holes to allow the bouquet wires to be passed through them, forms a handy base for water bouquets. It is easy to place each flower and leaf exactly where the eye of cultured taste may direct in such a base so as to form bouquets of any desired character, colour, or size. Every part of the bouquet and its base must be perfectly clean; no Moss or other material that would cause the slightest sediment must be used in its formation or arrangement. If any dust or dirt adhere to leaf or flower it should be washed off, either before or immediately after making.

Having finished the arrangement of the flowers, three things are needful for the completion and display of the water bouquet; these are—a bell-glass, or glass shade without a knob, a china or other plate or dish with a flat, even surface, and of course waterproof, and a tub or pailful of clean water. Glass, shade, dish, and water, must all be thoroughly clean; the pail or tub must be sufficiently large to allow the bouquet, glass, or other dish, and bell-glass, to be all submerged in water together. With bouquets of any size, the simplest mode of proceeding is to bare the arms beyond the elbow, place the dish in the tub, set the bouquet carefully in the centre of it, and, holding it in position with one hand, place the glass shade in the water with the other sideways and deep enough till it is perfectly full of water, then turn it over the bouquet and on to the dish without emptying it of water, or exposing any portion of the glass to the air; if properly done, there will be no air bubbles or empty space at the top of the glass; should there be any, the glass must be turned back again, re-filled with water, and turned over again till it is entirely filled with water. There can, however, be no difficulty if the tub or pail be large and deep enough to admit of the whole process of placing and covering the bouquet being accomplished under water. The dish must then be grasped firmly on each side and lifted out of the water, pouring a little of it from the outside rim of the dish in taking it out, so that it may be carried easily anywhere without spilling any, which it would be difficult to prevent were the lip of the dish beyond the globe full to the brim. The inexperienced, however, had better use a sponge for this purpose, as the change of level necessary to get rid of this outside water is apt to let out some from the inside also and to let in the air, which spoils the effect. A little water should also be left outside the bell-glass, as it tends to make the union between the glass and its base more secure. Dish and glass should then be wiped dry, and the bouquet placed on a drawing or sitting-room table. The whole bouquet floats in the water above the level of the dish, and the effect, if everything be perfectly clean, is most pleasing. The air in the leaves and flowers comes out and remains like crystals on their surface, and almost every sort of flower and leaf too, seems to vary in the amount of air expired by them. These aerial crystals form rapidly during the first hour or two, continue bright and beautiful for several days, and then many of them seem to collapse in the water. Bouquets of this kind must, of course, be handled and moved with care, and the dish on which they stand must be held nearly level. Those to whom their management is entrusted must be cautioned not to hold them on one side in dusting, or not only will the water come out with a rush, but the glasses will often break into fragments with the pressure of the atmosphere upon the internal vacuum caused by the loss of the water. Of course it will be understood that in such bouquets the water is kept in the glass by atmospheric pressure, and that being the case, it will be obvious that the air outside would support a column of water under the conditions described as high or higher than the ceilings of most sitting-rooms, therefore glasses of any size may be used with safety. In renewing such bouquets some care is necessary. The only safe course, in fact, is exactly the same as that pointed out for enclosing them in the glasses. Remove dish, glass, and bouquet just as they stand, plunge them overhead in water, and the whole will fall asunder. To the careful observer the bouquet and water alike give obvious notice of time for removal. When the flowers lose their brightness, and the water becomes a little cloudy, the bouquet should at once be removed. Glass, dish and weight must all be scrupulously cleaned, and a new bouquet made and placed in position, as already pointed out. The lasting qualities of such bouquets are not wholly owing to their submersion. They also escape all gas and fire-dried air, and enjoy a much more uniform temperature than they would do under other conditions. They likewise admit of the use of flowers that may be injurious or disagreeable to many from their excess of sweetness or of disagreeable odour. For example, many have a positive dislike to the odour of Chrysanthemums; these, especially the Japanese ones, with their long, thread-like petals, are among the most interesting flowers for water bouquets. Pancratiums, again, Eucharis, Nymphæas, and other Liliaceous plants are excellent for the purpose, as are also Narcissi, Hyacinths, and Snowdrops. Many of the Begonias and Moss Rose buds are remarkably beautiful in water bouquets. But any or all flowers may be tried; and those who have few or no flowers may make chaste and pleasing water bouquets with nothing but

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leaves and berries, such as Mosses, Ferns, Grasses, Holly, Retinosporas, or even Hips, Haws, and Ivy leaves. Water bouquets would be useful in smoky towns and crowded dwellings, where flowers droop and fade almost as soon as they enter them.

WORK IN SEASON.

THE VEGETABLE GARDEN.

CELERY.—The last sowing of Celery should now be ready for planting out. If the trenches have been prepared beforehand, as advised some time since, run the hoe over the surface to destroy any weeds that may be vegetating. Give the plants a good soaking of water before moving them; and if they have been treated as directed, by being put in a nursery-bed four or six inches apart, they will now be in fine condition. Remove them with as many roots as possible and as much soil as will adhere to them. In moving Celery plants there should never be occasion for the now almost obsolete practice of cutting off or shortening a considerable portion of the leaves at planting time; on the contrary, Celery, more than most crops, should never, through the whole course of its cultivation, from the time the plants appear above ground until they are fit for use, receive a check more than is inseparable from transplanting them, even when that operation is performed with care. If the trenches have been prepared for double or treble rows, put the plants in, 1 ft. apart each way; if for single rows, 9 inches between the plants will be sufficient for ordinary purposes. In making the holes use a planting trowel, and see that they are large enough to admit the roots without crushing them together; give each row a good watering as soon as planted. Celery costs more in manure and attention to grow it well than most vegetables, and it is worth while to treat it in a way calculated to produce it in good condition.

LEEKS.—When indifferently grown these are little better for the purpose for which they are required than Onions. To obtain the peculiar mild flavour which Leeks possess when large and freely grown, the plants must not be allowed to become stunted by being too close in the beds. To prevent this, thin them out so as to leave them 6 or even 8 inches apart.

ONIONS.—Onions should be thinned before they get too large. If the soil is hard and dry give a thorough drenching before undertaking this operation, so that the removal of any need not injure those that remain, which often happens when the ground is hard. As to the distance that the plants should be left apart, this will entirely depend on the kinds grown. The larger growing sorts should be left 8 to 9 inches apart, but 6 inches will be ample for the smaller kinds.

CARROTS.—Advancing crops of Carrots should be again looked after to see that they are not left too thick, especially the larger kinds.

TURNIPS—Will also require attention in this respect. There are few crops that suffer so much as this if allowed to stand too close together, as, when in this state, they run to leaf, forming bulbs that are not only small, but very poor in quality.

BEET.—Thin out all advancing crops before the plants get so large as to interfere with the growth.

CABBAGES.—The last sowing of these and the other members of the Brassica tribe should now be ready for planting out. Cabbages and Cauliflowers at this season are liable to suffer from the ravages of the root-grub. In old gardens the plants are generally the most affected, and to such an extent in some cases does this occur that frequently almost the entire crop of these vegetables are destroyed. Besides the whole or partial loss of the crop, this is very annoying to those who take a pride in seeing in their kitchen garden that unbroken uniformity in the different vegetables grown that gives evidence of good management; yet in soils the most infested with these pests a little extra labour at the time of planting will secure these vegetables in a great measure from destruction. At the commencement of the planting season procure a maund or two of dry powdered lime, to which an equal quantity of soot should be added; this quantity will suffice for a large garden. When the different crops of this family are being put out, make the holes for them rather larger than usual, and as the plants are dropped into them half fill up with earth, then give them a good soaking with water, after which put to each plant, all round the stem, a handful of the lime and soot, then draw in the remainder of the soil. This simple process will take a little more time than planting without the use of the mixture; but those who use it, will be spared the annoyance of seeing their plants turn that peculiar blue tint in the leaves and flag in the sun, which is a sure sign that the roots are gone, and that all affected in this way may be consigned to the refuse heap. Where water is given at the time of planting it is necessary to apply it as above directed before the lime and soot, as, if the latter be put to the plants first, it will be washed away from the stems and only have a partial chance of being effectual.

SURFACE DRESSING.—The earlier crops of Cabbages, Cauliflowers, Broccoli, Brussels Sprouts and Knol Khol will now be much benefited by a liberal surface dressing of manure, after applying which, they should be copiously supplied with water. As to the best manure for the purpose, there is much diversity of opinion. The old native method of opening the roots and applying a dressing of partially decomposed Mustard or Linseed Cake is still extensively practised. These have, however, one drawback, and that is, although they are very powerful stimulants for immediate effect, their effect is not lasting, and unless followed up by a second and frequently a third application at intervals of about a fortnight, they often do more harm than good.

During the past few years we have employed the following compost instead of Cake only: very old sheep manure twenty parts; Mustard cake or *khullee* five parts; Guano one part. This mixture we have found to possess many advantages—it does not over stimulate the plants as is too frequently the case with cake only; it is quite as speedy in its effect, and is also lasting, rarely requiring to be repeated except in very poor sandy soils that require a superabundance of moisture.

THE FLOWER GARDEN.

ANNUALS.—These will now be starting into full growth, and many of them will require to be trained out and nicely pegged down as they advance. The borders in the mixed flower garden will require to be kept up to the extreme of neatness by staking and tying the plants as they require it; hoeing and raking the borders at short intervals as they require it, and clearing away all old flower stems and decaying leaves. A little dexterity in the use of the hoe will leave a regular surface without the use of the rake—it is one of those tools we dread to see in a nice bed or border; many plants that are ruined by "Mr. Nobody" may easily trace their destruction to a whip from the rake: for all such purposes we would keep that tool under lock and key. Thin out all seedlings as soon as they are sufficiently advanced; this is an operation that is too frequently neglected in the majority of gardens, sometimes from carelessness, but more generally under the belief that the more plants we can grow in a given space, the larger the crop of flowers will be: this is an entirely mistaken idea; a dozen strong sturdy plants with plenty of room to breathe and grow freely, will produce more bloom than a hundred weak straggling seedlings that have to maintain a continuous struggle for their existence.

POT PLANTS.—This is a good time, when water requires to be given so often and abundantly, to ascertain the state of drainage, and if defective to remedy it, for no plant with a defective drainage can ever thrive satisfactorily. In the case of plants set on the ground one fruitful source of defective drainage is caused by worms getting in at the hole in the bottom of the pot and working the earth among the drainage so as to clog it up. A neat preventitive is using metal or earthen caps to go over the drainage holes. An easily come-at-able mode is to place the convex side of a crock or broken piece of pot over the hole, which will prevent the smallest worm getting in, and yet if the rest of the drainage is placed nicely over it, will not prevent the escape of water. The drainage will be kept more free, and be more effective if a little moss or cocoanut fibre is placed between it and the soil.

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ROSES.—Roses should now be growing freely, and to induce the production of vigorous flowering wood the plants must be kept liberally supplied with water. Rich manures are of no value to the plants without a sufficient supply of moisture to render it in a fit state to be absorbed by the plants. By liberal watering we do not mean a daily sprinkling with a watering can; this frequently does more harm than good, rendering the soil so hard as to make the admission of air to the roots of the plants, which is so essential to their existence, almost impossible. A drenching of half a dozen gallons applied once a week to each plant, will do ten times as much good as if it were supplied at the rate of a gallon a day.

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Extracts.

THE SIZE OF GARDENS.

Most gardens are too large. This may seem a strange assertion; but it is nevertheless true. No one has ever attempted to measure out pleasure from paintings by the foot or yard square of canvas. Nine out of ten gardens are too large to be enjoyable. Size is the smallest factor in artistic pleasure—if, indeed, it be one at all; good keeping, appropriate furnishing, are of far more moment. Now both of these, however essential, are extremely costly; hence either or both are often seriously neglected to the loss of all true pleasure. And if not so bad as this, the struggle of keeping up the garden is such a strain upon our means that the exertion often exceeds the pleasure, and there is not the slightest need for these serious drawbacks. There is no more necessity that the art of horticulture should be dragged out over a great extent of land than the art of painting over so many square yards of canvas. Large pictures are, indeed, held by some to be vulgar on account of their mere size. This may be carrying art criticism to extreme lengths, but assuredly the canon holds good in regard to many gardens. Let those who are fond of horticulture boldly face facts, and cut their gardens down to their means if they would thoroughly enjoy them. Gardening may be either made a pleasing recreation—a delightful pastime for spare hours—or it may become a burdensome, oppressive, enervating luxury, and eat out a good many of the higher pleasures and nobler enjoyments of life. The springs of the pleasure which it yields lie hidden not in the width of its walks, the number and height of its walls, the grandeur of its slopes or terraces, the size of its beds or borders, the broad expanse of its velvety lawns, nor the perfection of its specimens or mass of trees, shrubs, flowers, or plants, but in the spirit in which it is prosecuted, and the pure delight which its pursuits inspire. Horticulturists must be humble, gentle, reverent, earnest, grateful, if they would be happy in their pursuit. And all these qualities may be as fully developed in small gardens as in large ones. Only disappointment can come of disguising the fact that high keeping is costly. It is not the mere matter of one digging and one hoeing or planting and filling, but many. The farmer may reap profitable crops with a minimum amount of labour; the gardener cannot, for his best crop of pleasure is really reaped every day, from having his garden kept in a perfect state. Bad workmanship, or weeds, or a tool out of place, may mar a whole day's pleasure, just as the most exquisite picture begets a sense of pain when seen in a bad light, or through a blinding screen of dust. It should never be forgotten that a garden is, or should be, a charming picture, not stored in a lumber room, but displayed for exhibition all the year round; hence the importance of high and perfect keeping at all times. Then, again, a garden is a finished picture. A great many seem to forget this. Some people's gardens are ever being painted in or done up in new frames. It is impossible to enjoy any sense of repose owing to the bustle of busy workmen—to see the effects of light, shade, or play of colours for paint-pots and brushes. The fussy activities and unfinishedness of gardens are fatal to all artistic pleasure. They are easily avoided, if one would only exercise forethought. The rule in some of the finest gardens is, no workmen visible after certain hours. All the work on prominent points is done early in the morning, and repose and finish reign over the garden undisturbed throughout the remainder of the day. So possible is all this, that questions have often been asked, when is the work done? where are the workmen? or have you any? Gardens should show results, not processes. One plant grown well, suited for its place, may give ten-fold the pleasure a thousand large specimens would do, packed into, rather than well arranged in, the most magnificent conservatory. And it is exactly the same in all other branches of horticulture. A patch of the vernal Forget-me-Not, so artistically posted as to form the eye of the drawing-room window, may confer more real pleasure than the thousand spring bulbs piled up in gaudy magnificence in beds or borders. But enough has been advanced to show that size is of far less moment in gardens than either good keeping or skilful arrangement. Fortunately, too, these latter are within reach of all, while the former, and the means and ability to do justice to large gardens, must ever remain the heritage of but very few indeed.—*Country*.

SUNDAY GARDENING.

Amidst the turmoil and strife created by contending factions over the sanctity of Sunday or otherwise, it is instructive to note the fact, so obvious to gardeners, that nature knows no seventh day of rest, and continues her work with the same regularity and despatch that she shows on all other days of the week. We say this natural fact is so obvious to gardeners, because their labour in certain departments, and in certain seasons especially, can know no cessation. We have often heard very good people, or at least persons who have their own estimate of goodness, declaiming against certain trades and occupations, just because they rendered Sunday labour imperative.

But argument of that kind is open to sharp retort, and especially so when employed by those who have large gardens, or keep live stock of any kind necessitating Sunday labour on the part of their employés, if not on their own. Let us take the present season for instance, especially when the sun shines out warmly, and houses and plants need incessant attention. The most conscientious of Sabbatarians knows that the neglect of the requirements of nature for one day may undo all the work of the year, just because whatever man may ordain with reference to the seventh day rest, nature is not amenable to his will.

Plants must be watered, air must be given and withdrawn, shading must have attention, for the sun will shine, the rain will fall, the wind will blow,

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the frost will be as intense on Sundays as on other days, and neglect of ordinary precautions, even but for a few hours, means loss and misfortune, as many a man in charge on Sundays has discovered to his sorrow.

Even those whose vocation lies in the production of seeds find that here, too, there is no standing still, no waiting for the pleasure or convenience of man. Seeds will ripen and waste, if not carefully gathered, let the day be what it may, and the grower cannot live on waste. Nay, waste of anything good is wicked, and there are many forms of wickedness in the world very much worse than are those found in Sunday gardening. We have seen fruit spoiling—who has not?—on Sundays, as on other days, from neglect to gather, and we have seen numbers of persons employed on Sundays gathering, that it may be good food for man, and not be spoiled.

The exigencies of gardening are many and imperative; they necessitate much absolutely necessary work, but still work that is not found in many other vocations not so dependent on the operations of nature. Persons of strong religious views may be gardeners, and assume all the weighty responsibilities incidental to gardening with the utmost conscientiousness, if they view their positions and duties with wisdom and judgment. If they cannot do so, and are ever declaiming the absolute perfection and force of the Fourth Commandment, they are grossly inconsistent if they still continue to exist in and by a vocation that renders Sunday labour so imperative

Our great dramatist has told us to find sermons in stones, books in the running brooks, and good in everything. This adjurgation is one that needs constant repetition, for men sadly and cantankerously fail to find, or rather look for the good which is so universal. The humblest garden labourer, if he be a thoughtful man, and goes about his work with love and veneration for all the beauty and goodness which surrounds him, may indeed find sermons in his surroundings, and sacred harmonies in the sweetness and beauty which it is his happy lot to enjoy. A simple flower, or tiny plant or insect, may speak home to some hearts with more power than could the most eloquent of human preachers.—*Gardening World*.

HYACINTHS IN POTS, BEDS, AND GLASSES.

Bulb catalogues, which are now making their appearance, remind one that the season for obtaining the supply of Hyacinths has again come round, and those who would desire to have these much-esteemed favourites in flower early should lose no time in sending their orders. It is generally supposed with these, as with most other things supplied by nurserymen, that those who come first are best served, which is not to be wondered at, as otherwise the heaviest and most valuable bulbs might be left on hand, when they would, if sent out have brought credit to those who supplied them, and have given increased satisfaction to the buyer. Whether or not first-comers have the preference, certain it is that to get Hyacinths in bloom by Christmas, or soon after, they must be potted or put into glasses at once; but, unless particularly required for that early season, it is best to wait a month or so later before starting them, as then they will come considerably stronger and finer. There is one kind, however, that is naturally of an early-flowering character, and well suited for forcing—the white Roman, so sweet and easily managed that no one should be without a few pots, to come in before the others; but, as these are considerably smaller, it is necessary to grow several together to produce much effect. A 6-in. pot is quite large enough to contain as many bulbs, and if these be placed at equal distances apart they form a good mass to stand in a vase in a room; or if for cutting, a quantity of bloom may thus be had in a small space. Single pips of these, mounted, answer admirably for bouquet making, and they are therefore valuable for that purpose, coming in as they do when other white flowers are scarce. The soil best suited to grow them in is a light fibry loam, made rich by the admixture of any kind of mild, thoroughly decomposed manure; and in placing the bulbs in this a pinch of sand should be put under the base of each, so as to prevent any contact between them and the soil, otherwise they are apt to rot at that particular part. The after treatment of these Roman Hyacinths, in preparing them for forcing, &c., does not differ materially from that requisite for the others; and, as these will be touched on in due order, that part of the subject may be passed over.

Those I have principally to deal with now are the Dutch, and in ordering these it is generally best to leave the selection of varieties to those supplying them, as it often occurs that the stock of some particular kind is scarce, and the bulbs inferior to others which are grown more largely, and from which selections of the best may therefore be made. It is not the largest bulbs, however, that are always the most preferable, as much depends on their weight and ripeness; besides which, they differ much in size according to the sorts, some being altogether closer and more compact than others, that would readily take the eye of a purchaser. In regard to beauty and general symmetry of flowers, the single varieties are best, the double kind frequently coming with crowded pips and deformed spikes, which is seldom the case with the former. The time for potting will in a great measure depend on the time they are required in bloom; but, as a rule, it is best to allow them to come slowly on instead of potting late, as then they often have to be hurried to make up for the delay. Those who have to keep up a prolonged display generally pot at intervals of a couple of months or so, beginning with the first as soon as the bulbs can be obtained, and continuing on as late as March or April; but it is a question if anything is gained by keeping them so long out of the soil, as they must perforce lose strength; whereas if potted and kept cool, masses of roots would form to support the spike as soon as it emerges. For making a fine display there is nothing like growing three bulbs in a pot, a 7-in. size being quite large enough to contain sufficient rich soil to support that number. Those who have once had them in this way are not likely to be satisfied with single plants, as there is no comparison in the effect which they produce, and when grown three together they may be all of one colour, or arranged for contrast according to taste.

In draining the pots one crock is quite sufficient, and it is a good plan to scatter over this a little soot to exclude worms, which otherwise are apt to be a source of trouble. As to soil, nothing suits better than good friable loam, rotten cow manure, and leaf-mould—of the latter two, in the proportion of about one-fifth of the former— and this mixture should be used moderately dry, and pressed in the pots somewhat firmly, so that when finished the crown of the bulb shows just above the soil. The next thing is to place the pots level and give a gentle watering through a fine rose, and allow them to stand for a day to drain and dry a little before being covered up with half-rotten leaves, Cocoa-nut fibre, or anything of that kind, to exclude the light from them till they have formed roots and the tops begin to grow. As soon as this takes place, the covering must be gradually removed, so that the young blanched leaves do not suffer from sudden exposure; and when they will bear this, they cannot well be placed too close to the glass, or receive too much air whenever the weather is favourable. So treated, the spikes and foliage come sturdy and strong, and will then bear forcing without becoming unduly elongated, as they otherwise would be. Although Hyacinths will grow in bottles of water and require plenty of moisture, they will not succeed in a wet stagnant soil, and therefore, till the pots are well filled with roots and the plants are making active progress, watering should be done with care and judgment; but after they get fairly forward it is absorbed too quickly to do any harm.

Bulbs intended for glasses should be examined to see if they are sound at the base, and have any loose part removed, as when placed in water this is apt to lead to decay. Clear soft water is best for these, and this may be kept sweet by putting into it a few small pieces of charcoal which is a powerful deodoriser, and highly congenial to the roots of all plants. The point with Hyacinths in glasses is to see that they are kept perfectly dark at starting, and have only just sufficient water to touch the bottom of the bulb, and to keep this replenished from time to time as occasion requires. A close cupboard answers admirably to place them in till they get a start, from whence they should be removed by degrees to the window, and set as close to the glass as possible, that they may have the full benefit of all the light which such a situation affords.

As regards those to be planted in beds, November is quite early enough for getting them in; but the thing now to be done is to prepare the soil by trenching it well up, that it may have time to subside and be ready when the right season arrives. If this be not done early, it settles irregularly after the bulbs are in, making the surface uniform some are buried much deeper than others, which retards their progress in the spring and makes their flowering later, thus giving the beds a somewhat gappy appearance, instead of having them in full beauty at one time. In situations

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where the soil is naturally cold and wet, a little drainage is necessary, for which purpose nothing answers better than broken bricks, put in at a depth of from 18 in. to 24 in. or so. If on these some half-rotten manure be scattered, the interstices will be kept open for years, and the percolation of water be so regular that the bulbs will lie snug and safe for the winter, instead of rotting away, as they sometimes do when less favourably circumstanced. A handful of sharp sand put in around each when planting is a great help in warding off decay, as it prevents the soil from coming in immediate contact with them, and keeps them altogether in a more uniform condition as to moisture than they otherwise would be. In planting, the best effect is produced by having the rows about 9 in. or 10 in. apart, and the bulbs the same distance from each other in the rows, but placed quincunx fashion, so far at least as the shape of the bed will allow. The planting complete, the neatest way, and the best as regards the safety of the plants, is to finish off the surface with sifted leaf-soil, which is a capital non-conductor, as is also Cocoa-nut fibre, which may be used instead where the former is not readily attainable. Good Hyacinths for beds are now sold at a very cheap rate; and if taken care of, and allowed to stand and ripen off their foliage naturally after blooming, instead of being thrust aside, they will not deteriorate, but rather improve under good cultivation, and be available for the same purpose for an indefinite period.—*Field.*

ASPARAGUS ON THE FRENCH PLAN.

Referring to the size of Asparagus as grown in France and England, most people interested in the matter who have visited Covent Garden Market for the first time in spring have been amazed at the immense size of this vegetable as imported from France. I, in common with many more gardeners, was very sceptical as to whether it would be possible to grow such Asparagus in England, even though we were told in the "Parks and Promenades of Paris" that it could be, and also the way in which it could be done. Soon after reading that work on its first appearance I determined to make the experiment, and the opportunity of doing so also presented itself under favourable circumstances in the south of England. A piece of land to our liking was selected, a deep, yellow, sandy loam, inclining to clay and rather moist, though drained and on a gentle slope to the east. This was trenched about 2 ft. 6 in. deep and received a heavy dressing of stable manure, with half-decayed leaves intermixed, well incorporating the whole with the soil as the trenching progressed; after trenching, the whole piece laid some months to settle, or indeed until the time when planting had arrived. When about to plant, which was not until the young Asparagus had grown some inches, the piece of ground received another dressing on its surface of rotten manure and leaf-mould, which was dug in. It was then marked off in lines 3 ft. apart and planted with young Asparagus plants the second year from the seed 2 ft. apart in the lines, thus having 3 ft between the plants one way and 2 ft. the other. The sets were simply laid on the surface with the roots spread out horizontally, and then a portion of soil was drawn over them from the spaces between the rows; thus when finished, the ground appeared in shallow ridges and furrows from west to east, following the slope of the ground. The plants, being in full growth, were immediately watered, and were occasionally watered during summer. Every winter the whole surface of the ground was top-dressed with a mixture of horse manure and half-decayed leaves. Some of the stronger stems of the Asparagus received attention as to staking, as is done in the case of herbaceous plants to prevent them from wind-waving or being broken; but the position was a sheltered one, and little staking comparatively was required.

Now for the result. On the third year after planting—the fourth from the seed—we had the satisfaction of cutting as good Asparagus as to size as could be seen in Covent Garden; indeed, as to quality it was considered better, inasmuch as it was not blanched, although I am aware that blanching is by some considered to be an improvement. We were satisfied that the wide planting had very much to do with our success, but more especially the favourable character of the soil and its natural condition as to moisture. We were so satisfied with our success, that we had planned a plantation of Asparagus on a large scale on a piece of ground capable of irrigation, but was prevented by unforeseen circumstances from carrying the design into effect. It is probable that the higher average temperature of the south coast of England favoured the experiment, but, from experience in the north near the coast, I feel satisfied that greatly improved results may be expected from improved culture.—*The Garden.*

CURIOSITIES OF SEED-TESTING.

In making tests of seeds the fact must not be lost sight of that the finest-looking seeds, and those which show the greatest proportion of living germs, may not be the most desirable for the field or garden. Much depends on the variety—the choicest strains of some kinds producing seeds of inferior appearance and vitality. I have made some progress toward ascertaining the best methods and the most favourable temperature for germinating seeds of Wheat and the Cucurbitaceæ or Vine family. To aid in finding the best method I used some seeds which were fresh, well grown, carefully harvested, and not subjected to severe trials or exposure of drought and moisture, heat or cold. These reliable seeds were tested, side by side with others whose history was not certainly known. In the different modes of testing good fresh seeds varied much less in the per cent. which germinated than did those which possessed little vitality. In two trials only a few days apart, at about the same temperature, by one person, in the same room, with the same apparatus used in a similar manner, the same quantity of the lot of unknown Wheat was tested with the following results: In both trials, ten lots of 100 kernels each were placed in saucers of damp sand. Of the first, 81, 82, 84, 85, 85, 87, 89, 89, 90, 96 germinated, an average of 86·8 per cent.; of the second, 56, 75, 75, 76, 77, 78, 78, 79, 82, 89 germinated, an average of 76·5 per cent. Here is a difference in the results of 10·3 per cent., for which I cannot account. In August, on different days, many lots of fresh, hand-picked, hand-shelled red Wheat were tested in several ways at temperatures varying from 75° to 136° Fahr. Excepting one kernel, in one of several lots at two different times, the average was 100 per cent. of germinating seeds. In open ground, 1000 of these seeds gave an average of 94·9 per cent. Side by side with the above, the unknown Wheat varied from 39 to 86·8 per cent. in germination. Red Wheat germinated more slowly than white Wheat. Some experiments were made to ascertain whether seeds well dried after once or twice germinating would germinate again. In the case of Wheat, the plumule lived and continued the growth, if any growth was made, but the roots always died when well dried. If any growth was made a second or third time, new roots started out. Of fifty kernels of unknown white Wheat once germinated a little and dried, 96 per cent. germinated; twice dried, 88 per. cent. Of fifty kernels once germinated till the plumule became ½ in. long, and the roots 1 in. or 2 in., then dried, 82 per cent. germinated; twice sprouted and twice dried, 48 per cent. Of fifty kernels once germinated till the plumule became 1 in. long and the roots 1 in. to 2 in., then dried, 38 per cent. germinated; twice sprouted and twice dried, 14 per cent. again germinated. Some tests with new Wheat now under way show still more favourable results than the foregoing. Seeds of Squashes known as Turban, Boston Marrow, Hubbard or Marblehead, and the common field Pumpkin, tested in several ways at a temperature of 80° or lower showed results which were very variable and unsatisfactory. Tested in a temperature of 100° to 136° Fahr., the results were more uniform and the per cent. of germinating seeds much higher. Seeds of Water Melons and Cucumbers varied but little whether tested at 70° or 136° Fahr.—Professor Peel, in *New York Tribune.*

VENEER CUTTING IN AMERICA.

The introduction into this country some few years since of large sheets of thin wood like so much wall-paper, caused people to wonder by what machinery they were cut, for it was evident they were removed from the trunk of the tree in continuous sheets. These gigantic shavings were used in America for covering the walls of rooms, and they were affixed by a method very similar to that use for affixing paper. The process by which these thin veneers are prepared has thus been described by a contem

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porary :—The logs are delivered to the mill-yard in any suitable lengths as for ordinary lumber. A steam drag-saw cuts them into such lengths as may be required by the order in hand ; those being cut at the time of our visit were 4 feet long. After cutting the logs are placed in a large steam-box, 15 feet wide by 22 inches long and 6 feet high, built separate from the main building. This box is divided into two compartments. When one is filled entirely full the doors are closed, and the steam, supplied by the engine in the main building, is turned on—the logs remaining in this box from three to four hours, when they are ready for use. This steaming not only removes the bark, but moistens and softens the entire log. From the steam-box the log goes to the veneer lathe. It is here raised and grasped at each end by the lathe centres and firmly held in position, beginning to slowly revolve. Every turn brings it in contact with the knife, which is ganged to a required thickness. As the log revolves the inequalities of its surface of course first comes in contact with the keen-edged knife, and disappear in the shape of waste veneer, which is passed to the engine-room to be used as fuel. Soon, however, the uneveness of the log disappears, and the now perfect veneer comes from beneath the knife in a continuous sheet, and is received and passed on to the cutting-table. This continues until the log is reduced to about a 7-inch core, which is useless for the purpose. The veneer as it comes rolling off the log presents all the diversity of colours, and the beautiful grain and rich marking that have perhaps for centuries been growing to perfection in the silent depths of the great forest. From the lathe the veneer is passed to the cutting-table, where it is cut in length or width as desired. It is then conveyed to the second storey, where it is placed in large dry rooms, air-tight, except as the air reaches them through the proper channels. The pieces are here placed in crates, each piece separate, and standing on edge. The hot air is then turned on. This comes from the sheet-iron furnace attached to the boiler in the engine-room below, and is conveyed through large pipes regulated by dampers for putting on or taking off the heat. There is also a blower attached which keeps the hot air in the dry rooms in constant motion, the air as it cools passing off through an escape-pipe in the roof, while the freshly heated air takes its place from below. These rooms are also provided with a network of hot-air pipes near the floor. The temperature is kept at 165°, and so rapid is the drying process that in the short space of four hours the green log from the steam box is shaved, cut, dried, packed, and ready for shipment. After leaving the dry room the veneers are assorted, counted, and put up in packages of 100 each, and tied with cords like lath when it is ready for shipment. Bird's-eye Maple veneer is much more valuable, and requires more care than almost any other, and this is packed in cases instead of being tied in bundles. The principal timbers used are curled and bird's-eye Maple, Beech, Birch, Cherry, Ash, and Oak.—*Gardeners Chronicle.*

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HEAT—ITS INFLUENCE ON PLANT LIFE.

Residents in this country are but too painfully aware of the fact that it is far more difficult to produce an artificial low temperature than a high one. On this account our brother gardeners in Europe are able to cultivate successfully a far wider range of plants than we can ever hope to possess in this country, that is, until our engineers are able to devise means by which we may be able to lower the temperature of our plant houses with the same ease that our more fortunate friends at home are able to raise theirs. It is not, however, on the question of the production of artificial heat or cold that we intend to deal with at present, although we hope to do so in a future article. There is no questioning the fact that much more might be done than has yet been done in manipulating the great source of heat we have at command, *i. e.*, the sun. Now to speak of the sun as a plant killer, will probably startle many people. It is meant to do so, to startle them out of cruelty to plants into wise care and culture of them. But is not the sun the great source of plant life? Undoubtedly. How then can it kill plants? Easily: for the sun is not merely the source of light, but the centre of heat. The latter is as essential as light is to the life and health of plants; yet nevertheless heat in the wrong place at the wrong time, or in excess, speedily kills plants; and in practical horticulture plants are often exposed to one or more, and sometimes to all of these evils either in succession or together. For example, in cultivating plants under glass, if the leaves and stems are crowded up against the glass, they receive the heat and light of the sun in the wrong place, and are scorched or semi-scalded in consequence. The theory that the nearer the glass the greater the light, and consequently the better for the plants, is not unfrequently carried too far in practice. It hardly holds as a fact with our modern glass, which is so transparent as to transmit almost every ray of light unimpaired in brilliancy. The intense heat of the sun in this country renders it desirable to allow a considerable space between the glass and the leaves or stems. This allows the air to move freely, for it is found in practice that a free motion of the air is one of the best and most potent preventitives of leaf scorching or scalding.

Again, heat is in the wrong place when it is permitted to concentrate its energy on the surface or sides of pots. In some cases the leaves shield the roots from the scorching heat of the sun; this purpose is frustrated entirely when, under artificial conditions, the sides or surface of the pots are allowed to become unduly heated. Plants in pots in the open air, in verandahs and other exposed places, are often half, and not seldom altogether killed from the root-roasting to which they are subjected. We have felt flower pots so warm that we could not bear our hands on them without being burned. The poor

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roots that generally hug the sides of the pots closely, must indeed have a sorry time of it under such conditions; the best of them, too, are always in the worst place, that is, on the outside of the balls and in closest proximity to the hottest portion of the pots. Of course good cultivators adopt means to prevent the heat of the sun from crippling or killing their plants. Double potting tends to keep the roots cool; but amateurs as a rule seldom take such precautions, and the consequence is an enormous annual death-rate from the sun's heat in the wrong place. Some plants, too, are much more susceptible to injury from this cause than others. Camellias, for example, are perhaps more susceptible of damage than any other plant from the heat of the sun on the sides of the pots.

Standard plants—including Standard Roses—are often also severely injured from the exposure of the surface roots to the sun. The top is too high and too formal, or too much of both, to give them the amount of shade provided by nature, and disease and death follow as a matter of course the violation of natural laws. Many years experience has convinced us that the sun in the wrong place, that is beating fiercely on their surface roots, is one of the first causes of their destruction. Heat at the wrong time is almost as fatal as heat in the wrong place. Plants have their time and seasons of growth, and each of these needs a different degree of heat. For example, take the Camellia once more as an illustration. In its resting and through its flowering stages in this country a temperature of 45 to 55°, or even 60°, suits it well; apply 10° or 15° more heat to it then, and its flowers fall off in showers till not one is left, and it starts into growth out of season, to its destruction and the ruin of all hopes of any or many flowers next season. But as soon as its last flowers drop, and its wood-buds begin to burst into growth, it will thrive well in an atmosphere of 70° to 85° in a semi-saturated condition, and should have every direct heating rays of the sun shut out from its tender leaves for a month or six weeks. No sooner is its young wood partially matured, and its embryo blooms formed, than it may be safely inured to the open air, and will bear the full sun without injury.

Our last point—that solar heat in excess may, nay, does kill plants—is too well known to need elaborate explanation or proof. Cultivators are too familiar with cases of sun-stroke in which sometimes the entire plant, oftener a portion of it, is destroyed almost in a moment. But these obvious cases of speedy destruction convey no adequate idea of the full amount of injury or destruction brought about by an excess of solar heat. The sudden reflux of the sap, the softening and partial rupture and derangement of the tissues, the dissipation and waste of the juices, and consequent partial paralysis from exhaustion of vital fluids and force—these leave traces of weakness behind which render the plant a ready prey to disease and insect pest of all kinds. For it is true in vegetable as in animal life that the weak invite disease, while the strong resist it. And as to insect pests—the very excess of heat that lowers or exhausts the vital forces of plants, is often most favourable for the increase and strengthening of the pests that prey upon, devour and destroy plants. Of course it is well nigh impossible for the cultivator to protect himself from the evils of excessive solar heat under all circumstances in the open air; but with our choicer plants, especially those grown in pots, we can as a rule moderate the energy of the sun's heat by shading; and one of the first conditions of cultural success consists in seeing that no plant has either less or more heat than suits its character and constitution, and that this heat should be given to it at the proper time in the right place.

Editorial Notes.

MANURE TO BE EFFICIENT, must be as close to the surface as possible, in order that the nourishment afforded by it may be within easy access of the rootlets of the plants. If dug in too deeply, several years may elapse before it is decomposed.

NEW FORESTS IN FRANCE.—It is stated that several million acres being unproductive in France for farming purposes, the proprietors are taking measures to grow forests on these lands. It is estimated that in that country of high prices in timber, the lands will thus net 10s. per acre per annum in profit, and that there are enough of such lands in France to give an increase in productive profit of £5,000,000!

VEGETATION.—That vegetation of a certain kind will not only exist but flourish without rain appears to have been proved beyond doubt, for in Dr. Schweinfurth's account of his journey across the Arabian desert, published in *Petermann's Mittheilungen*, he mentions that in one part where no rain had been known for six years he found some acacias and tamarisk still green and flourishing, while the last traces of herbaceous plants had disappeared. A sky-blue salvia was found in profusion in more favoured localities.

A NEW METHOD OF KILLING SLUGS.—Some time ago M. Commandeur, of Paris, accidentally left in his garden a pot in which he had been making experiments with starch and iodine; the pot, imperfectly covered with a piece of board, remained exposed to the heat and rain for three weeks, when, on looking one morning into it, he was surprised to find it tenanted by scores of snails and slugs that had congregated in it from every part of the garden. He repeated the experiment several times, and ascertained that the emanations from iodine will attract these creatures from a considerable distance, when they may be killed by hundreds.

POTATO FLOUR.—In the last number of the *Monthly Magazine of Pharmacy* attention is drawn to the fact of the very great demand there is for Potato flour, the extent of which, it is said, is almost unlimited. This flour is simply the dry evaporated pulp of the common Potato. The whiter, and more free from black specks, the better, of course, is the quality. It is used for sizing and other manufacturing purposes, and by precipitation, and with the aid of acid, is turned into starch. In Europe it meets with a large and increasing demand in its primitive state as Potato flour. In Lancashire alone 20,000 tons are sold annually, and as many more would be taken if put on the market. When calcined it is used largely for silk dressing, as well as for other purposes. At present the quotation for Potato flour in Liverpool is nearly double that of Wheat flour.

MISTLETOE.—The Mistletoe was sacred of old with the Persians and the Massagetæ; and the reverence paid to it by the Druids was something very special, exceeding that paid to other objects of religious importance; for, as Pliny tells us, "The Druids hold nothing more sacred than the Mistletoe, provided it be on an oak.

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They look upon it as a certain sign that their god hath made choice of that tree himself. But it is a thing very rare to be met withal (on the oak), and when it is found they resort to it with great devotion." They deified the Mistletoe, and might approach it only in the most devout and reverential manner. When the end of the year approached, they marched with great solemnity to gather the Mistletoe off the oak, in order to present it to Jupiter, inviting all the world to assist at the ceremony, with the words. The New Year is at hand; gather the Mistletoe!"

TOMATO LEAVES *vs.* INSECTS.—"I planted a Peach orchard," writes M. Siroy, of the Iardin deHorticulture, Valparaiso, "and the trees grew well and strongly. They had but just commenced to bud when they were invaded by the Curculio, which was followed, as frequently happens, by ants. Having cut some Tomatoes, the idea occurred to me that by placing some of the leaves around the trunks and branches of the Peach trees, I might preserve them from the rays of the sun, which were very powerful. My surprise was great on the following day to find the trees entirely free from insects, not one remaining, except here and there where a curled leaf prevented the Tomato from exercising its influence. These leaves I carefully unrolled, placing upon them fresh ones from the Tomato, with the result of banishing the last insect, and enabling the trees to grow with luxuriance. Wishing to carry still further my experiment, I steeped in water some fresh leaves of the Tomato, and with the infusion sprinkled other plants, Roses and Oranges. In two days these were also free from the innumerable insects which covered them; and I felt sure that, had I used the same means with my Melon patch, I should have met with the same result.

TIMBER IN BRITISH COLUMBIA.—Though the agricultural capabilities of British Columbia may not be so great as other parts of Canada, its mines are doubtless very rich, and from a recent report of Professor Dawson of the Dominion Geological Survey, its forests are of great importance. Many first-class mills have been established in various parts of the country, and the total annual product is stated to be about 200,000,000 feet, of which 25,000,000 feet is exported to other countries, 25,000,000 feet used at home, and 15,000,000, feet sent to California. Professor Dawson estimates that 110,000,000 acres (or two-thirds of the whole province) are covered with timber. The Douglas Fir, or Oregon Pine, is the most valuable commercial tree. It frequently exceeds 8 feet in diameter above the ground, and rises to a height of from to 200 to 300 feet, forming large and dark forests. The Western Hemlock and Red Cedar are the other important trees of the province, both of which, the latter especially, grow to a great size. When the great plains of Canada become populous, the mines and forests of British Columbia should be of great importance, and their produce ought to provide a large and profitable traffic for the Canadian Pacific Railway.—*Times.*

PRESERVING FLOWERS IN THEIR NATURAL COLOURS.—In the last volume of the "Proceedings of the American Pharmaceutical Association" there is a simple receipt for the preservation of the natural colours of flowers in herbaria. The whole plant is drawn through a solution of salicylic acid in spirits of wine contained in a shallow basin or deep pie-dish, and afterwards swung backwards and forwards to remove the excess of liquid, dried between blotting-paper, and pressed in the usual manner. Care must be taken not to leave the plants too long in the solution, as a prolonged immersion discolours delicate flowers. The blotting-paper, too, must at first be removed frequently. Plants treated in this manner are said to dry rapidly and furnish specimens of superior beauty, retaining their natural colours in greater perfection than by any other process. The salicylic acid, which may be obtained at any chemist, must be dissolved in the spirits of wine in the proportion of 2 grains to 3 ounces. Methylated spirit must not be used, as it contains a certain amount of resin dissolved in it, which would render the plants sticky.

QUICKENING THE GERMINATION OF SEEDS.—We have before referred to the experiments made with camphor as a means of hastening the germination of seeds. Some time ago, Goeppert attributed a similar property to chlorine, iodine, and bromine. According to the "Comptes Rendus," these statements have been recently confirmed by the experiments of Heckel. Radish seeds exposed to the action of pure water began to germinate after an average interval of eight days; similar seeds, kept moist with iodine water, germinated in five days; with bromine water, in three; and with chlorine water, in two days. The monobromide of camphor was found to exhibit even greater energy than either of its constituents taken separately, or than a simple mixture of bromine and camphor, germination occurring after a mean interval of thirty-six hours. No explanation of this singular property is suggested. The alkaline borates and silicates were found to retard germination, even in relatively small proportions; stronger solutions checking the process for an indefinite period. Arsenious acid and the soluble arseniates prevented germination altogether by destroying the embryo.

PRESERVING FENCE POSTS.—There are paints, washes, and heterogeneous steeps recommended for preserving posts, but each are comparatively costly, and only partially successful. One great objection to the application of solutions externally rests on the fact that the sap, being confined, accelerates decomposition in the interior. Most foresters must have observed this. What I would recommend with fencing posts is that the materials, when felled, be directly sawn into posts and stored under sheds thoroughly ventilated, where they will remain at least a year exposed to sun and wind. The neck, or part between wind and water, of each post should be slowly charred over a strong fire—slowly, because our principle means heating the timber thoroughly to the heart, so as to extract any moisture which may be still lodged at the centre, and hardening a crust on the surface of the posts. Afterwards, to prevent the posts absorbing water, they should be well coated with coal tar, having its acid destroyed with fresh quicklime. The tar should be thoroughly boiled to evaporate all watery matter, and applied boiling hot. A large tank holding the posts set on end, and filled with the scalding tar from a boiler, answers the purpose very well. Of course the upper half of the posts can be painted when placed *in situ*. I am convinced that coal tar, properly applied to thoroughly seasoned timber, is far more effectual in preserving posts than creosoting or kyanising.—*Journal of Forestry.*

PLANTS KNOWN TO BE CARNIVOROUS HALF A CENTURY AGO.—Within the past few years the subject of carnivorous plants has received a considerable amount of attention from men of science and others. It has been asserted that certain plants, such, for example, as the Sundew (Drosera rotundifolia), capture, dissolve, digest, and absorb flies and insects which are placed upon or happen to touch specified portions of them. The insects and flies are, it is stated, devoured in this manner for the purpose of supplying the plants with food. The attention, says a correspondent of the *Times*, which this subject has excited, and the surprise expressed by many persons, led several to suppose that the utilisation of insects as food by Drosera was a new discovery. That it is not so, however, the following passage from "Coombe's Constitution of Man," printed in 1835, will show, Sec. 5, No. 6:—"Destructiveness is given, and man is constituted with a carnivorous stomach, and animals to be killed and eaten, exist.....Not only has Nature taught the spider to construct a web for the purpose of ensnaring flies, that it may devour them, and constituted beasts of prey with carnivorous teeth, but she has formed even plants, such as Drosera, to catch and kill flies and use them for food." Coombe probably copied from another writer, so in all probability the vagaries of carnivorous plants were known more than half a century ago, instead of the other day, as one would suppose, had he nothing else to judge from but the sudden demand for Sundew by hundreds of persons who desire to gratify a cruel curiosity in observing the wriggling agonies of an ant or fly placed upon its leaves.

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WHERE THE WOOD GOES.—The *Fishkill Standard* has taken rather to heart the deplorable extent to which American forests have of late been disappearing, and has been endeavouring to ascertain what becomes of the vast stores of timber that are every year hacked down in all parts of the continent. It finds that shoe-pegs and lucifer matches make important items in the continual draft on forest trees, the matches alone demanding no less than 300,000 cubic feet of the best Pine every year. Lasts and boot-trees require an amount of Birch, Beech, and Maple annually sufficient to cover more than 12,000 acres of land, while another 12,000 acres have to be stripped to supply the handles of tools. Brick-baking consumes 2,000,000 cords of wood, enough to clothe 50,000 acres of land. The repair of telegraph poles every year requires 300,000 trees, while the number actually established represents some 800,000 more. The sleepers, or "ties," and fences of railways, as may be imagined, make an enormous demand on American woodlands. The "ties" alone consume annually as much wood as 75,000 acres will grow in thirty years. American railways, we believe, are not fenced throughout their length, but it is estimated that if they were to be it would entail a cost of 45,000,000 dols., and would of course accelerate wonderfully the disappearance of forests. The repairing of such fences alone would cost 15,000,000 dols. a-year. During the year 1874, 12,000,000 dollars' worth of wood was employed in making packing cases; and every year it is estimated that waggon-building, and the making of various kinds of agricultural implements, require a supply of wood worth more than 100,000,000 dols. It appears that the invention which brought pegged boots and shoes into fashion is responsible for the stripping of its forest clothing of no less than 2,500 acres of American land annually.—*Globe.*

Original Articles.

THE ROSE.

We now come to the many classes that are grouped together under the head of Summer Roses.

We may here repeat what has already been previously stated, that very few members of this section are adapted for cultivation in the plains, or at least not in Bengal. Probably, however, amongst our readers there are a few ardent rosarians who are blessed with a more favourable climate, and to these a short description of the various families may prove useful; for amongst them there are some of the most beautiful roses in cultivation. By the term *beautiful* we do not wish to infer that they rival the perfect form of the best of the Hybrid Perpetuals, or the delicate tints of colour found in the Teas, but these have beauties of their own—some for their graceful habit of growth, others on the contrary for their wild, vigorous, free flowering nature, defying all attempts to keep them within bounds, and a few for their unequalled fragrance. Take, for instance, the well-known Bussorah, which, a few years since, was almost the only Rose known in our Indian gardens; and although in most instances, it has been discarded for the more showy Hybrid Perpetuals, none of them can bear comparison with it in fragrance.

PROVENCE ROSES (*Rosa centifolia.*)

This is probably the most ancient of all cultivated roses. It is supposed to have been the hundred-leaved rose of Pliny, and the favourite flower of the Romans, and is believed to have been first introduced into English gardens about the year 1596, and and even up to the present day it is, with the old double wall flower, the chief ornament in the cottage gardens in the agricultural districts. They require to be pruned very closely; every shoot must be shortened to three or four buds. If not treated in this way they soon become straggling and unsightly. The following are the most useful members of this family:—

Name.	Description.	Habit of Growth.
Cabbage Provence	Rose globular, full, very large and fragrant.	vig.
De Meaux or *Pompon*...	Rosy, pink and lilac, very small and pretty.	dwf.
Unique or *White*.....	Pure white, a beautiful old variety.	vig.

THE MOSS ROSE (*Rosa centifolia muscosa.*)

This, as the botanical name implies, is but a variety of the preceding group, though how or where it originated there is no authentic record. Some of our early writers on gardening mention the fact that the old double Moss Rose was introduced into England from Holland about the year 1596, strange to say, about the same time as its supposed progenitors found a home there also. That it is only an accidental shoot or offspring of the Provence Rose is borne out by the fact that plants raised from seed of the Moss Rose frequently revert to the old Provence form, showing no disposition to moss at all. Even in old plants it is no uncommon occurrence to find whole branches that produce flower without the slightest appearance of moss. Unfortunately in the plains there is no chance of cultivating this group with any success. Plants will occasionally grow with astonishing vigour and flower freely, but with no more appearance of moss than there is in our old friend Rose Edouard. A curious instance occurred to us some two or three years since with one of this family. We had a very fine plant of *Baronne-de-Wassenaer*. This had flowered for two years in succession, but, as previously stated, without any of the glandular excrescence we term moss. Happening to mention the circumstance to a very ardent rosarian residing in Simla, he suggested we should try what a change of air would effect in it.

It was accordingly transferred to his mountain home, and within three months the plant was in flower again, every bud on this occasion appearing in its proper form, and so it has continued to bear up to the present day. Thinking that after the plant had become well acclimatised, it would perhaps retain its proper form, we have, from time to time, had at least a dozen of its offspring brought down to the plains, but those that have survived this ordeal and produced flowers at all, have invariably been found entirely devoid of moss.

Name.	Description.	Habit of Growth.
Alice Leroy	Flowers lilac blush, sometimes rosy pink, large and double, good mossy buds; form cupped; very vigorous habit.....	vig.
Baronne de Wassenaer.	Flowers deep rose, globular in form, produced in large clusters; a good rose, but scarcely full enough.....	vig.
Celina.....	Flowers deep rosy crimson, shaded with dark purple, occasionally streaked with white, very fine in the bud; a delicate and weak growing variety.....	dwf.
Common or Old Moss...	Flowers pale rose, very large and full, form globular, growth vigorous, foliage fine; one of the best.....	vig.
Comtesse de Murinais ...	Flowers pale flesh when first opened, but quickly changing to white; very large and double.....	rob.
Crested Moss.....	Pale rosy pink, outer petals often assuming a deep lilac tint; the flower buds beautifully crested, the crest sometimes extending to the leaves; an extraordinary and beautiful rose first noticed growing on the walls of a convent near Berne in Switzerland in 1827	rob.
Gracilis	Deep pink, globular in form, large and full, very free blooming	vig.
Lanei	Flowers rosy crimson, occasionally tinged with purple; large and very full, form globular, buds broad, bold and well mossed	vig.
Little Gem	A miniature moss rose; it forms compact bushes densely covered with small double crimson flowers, beautifully mossed	dwf.
Luxembourg	Flowers deep crimson, often shaded with purple, of medium size and double, form expanded, growth very vigorous	mod.
Pompon (De Meaux).....	Flowers blush; centres pale pink, small and full; cupped form. A very interesting little rose, but of rather delicate habit.....	dwf.
White Bath.....	Flowers paper white, occasionally producing striped or pink petals, well mossed, exquisite in bud; very large and full	mod.
Unique.....	Flowers pure white, occasionally tinted with lake, medium size, well mossed, beautiful cupped shape; one of the best	mod.

HYBRID OR PERPETUAL MOSS ROSES.

This is one of the many new sections into which the Rose family is now divided, possessing all the properties of the Moss Rose with the desirable addition of being as free blooming as the Hybrid

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Perpetuals. They must be grown in very rich soil and require very close pruning.

Name.	Description.	Habit of Growth.
Blanche Moreau	Fine pure white, large, full, and opening well, of perfect form, blooming in clusters	vig.
Deuil de Paul Fontaine	Flowers very large, but rather loosely formed, of a deep reddish purple colour	vig.
Madame Edouard Ory	Reddish crimson, very large and full, habit free and good; one of the best and most constant blooming	vig.
Madame Moreau	Bright rose, veined and shaded with red; flowers large, full, and expanded, as highly scented as the old moss	vig.
Soupret et Notting	Fine bright rose, of perfect form, very large and good, highly scented; the finest variety in this group	vig.
Perpetual White	Pure white, blossoms in large clusters, not constant	mod.

French Roses.

The French rose (*Rosa gallica*) is supposed to have been introduced into England towards the end of the sixteenth century, and until the introduction of the Hybrid Perpetuals and Teas was the favourite Rose of our English growers. It is stated that the once famed nurseries of Messrs. Loddiges of Hackney possessed a collection of upwards of two thousand varieties, but undoubtedly it was the same then as it is now, where such an immense number of kinds are brought forward. The names are pleasing to the ear of the enthusiast searching for novelties, but the eye searches in vain for distinct characters in the flowers. Rivers, in his Rose Amateurs' Guide, gives the following interesting history of this group: "This was one of the earliest roses introduced to our gardens, and is supposed by some to be the *Rosa Milesiana* of Pliny; it has also historical claims of much interest, for the semi-double bright red rose grown in Surrey for our London druggists, and still cultivated extremely in the environs of Provins to make their celebrated conserve of roses is, according to a French authority, the red rose, the ancient badge of the House of Lancaster. Somewhere about the year 1277, a son of the King of England, Count Egmond, who had taken the title of Comte de Champagne, was sent by the king of France to Provins, with troops to avenge the murder of the Mayor of the city who had been assassinated in some tumult. He remained at Provins for a considerable period, and on his return he took for his device the red rose of Provins, which Thibaut, Comte de Brie, had brought from Syria, on his return from a crusade some years before. The white rose of the House of York was probably our very old semi-double variety of *Rosa alba*.

Our Provins rose is also associated with recollections of the unfortunate House of Bourbon; for when Marie Antoinette came to France in 1770, to espouse Louis XVI., she passed through Nancy, a city about 160 miles to the south-east of Provins, the inhabitants of which presented her with a bed strewed with leaves of the Provins rose. Alas! her bed was twenty years afterwards more abundantly strewn with thorns by the inhabitants of Paris. Charles X. also on arriving at Provins on his return from the Camp at Luneville, September 21st, 1828, was received in state by the authorities who deputed twelve young ladies to present him with the flowers and conserves of roses."

THE MOSS ROSE.

The Angel of the Flowers one day
Beneath a Rose tree sleeping lay,
The spirit to whom charge is given
To bathe young buds in dews of heaven.
Awaking from his light repose,
The Angel whispered to the Rose:—
"Oh fondest object of my care,
Still fairest found, where all is fair;
For the sweet shade thou givest to me
Ask what thou wilt 'tis granted thee!"
"Then said" the Rose, "with deepened glow,
On me another grace bestow."
The spirit paused in silent thought—
What grace was there the flower had not?
'Twas but a moment—o'er the Rose
A veil of Moss the Angel throws,
And robed in natures simple weed,
Could there a flower that Rose exceed!

THE DAHLIA.

(*Continued from page* 90)

For many years there were considered to be but two species of Dahlia—the *Dahlia superflua* and *frustranea*—the fertile and infertile rayed *Dahlia superflua* or *Variabilis*.—This is probably the first Dahlia introduced from Mexico in 1789. The colour of the species was purple, but it soon broke into flowers of almost all colours, such as red, dark purple, yellow, lilac, sulphur, white, as well as many double and semi-double varieties. The chief difference between this and the next oldest species, *frustranea*, is that the stems are not glaucous and the ray florets are female and consequently fertile. The flowers of this species are generally self-coloured.

D. Frustranea coccinea or the barren-rayed Dahlia.—This seems to have been introduced from Mexico in 1802. The stems are described as glaucous, leaves hairy, and the ray florets barren or neuter; they are generally also flat or nearly so. It is not supposed to be so fruitful of varieties as D. superflua, though it has given origin to almost every shade of colour. This species is closely related to, if not identical with, the Dahlia known as *Mexicana*, *Cervantesi* or *variabilis*. It is easy to see how these names might all be originally applied to the same species or plant, as Mexico is the native country of the Dahlia. Cervantes was its first cultivator in the Botanic Gardens of its native clime. Whilst the Dahlia has been from first so exceedingly variable that if you sow a packet of *D. coccinea* seed you reap a crop of almost every shade of colour, stature and habit of plants. But in the days when species were based on the flimsiest of distinctions, we had *D. aurantiaca* and *D. lutea* merely or chiefly distinguished from *variabilis* or *coccinea* by more or less of orange or yellow.

Dahlia gracilis, one of the most elegant of all the species, was introduced from Mexico by M. Roezl in 1873. Its leaves are more finely divided than in that of any other known species or variety. This may prove a great improvement in the future history of the Dahlia, as the foliage is considered somewhat coarse by some cultivators. The leaves of *gracilis* are somewhat short as well as slender, the petals first breaking into three within an inch or so of its base. The leaf too divides in three, as also the central one, so that the whole leaf is cut into fine and graceful looking divisions. The stems are slender and glaucous, and the flower from 2 in. to 3 in. in diameter, of a brilliant orange-scarlet with a golden disc much in the way of *coccinea*.

D. Decarsneana is another species of the *coccinea* type, but the style of the plant is more elegant, the stem and flower stalks being slender in the manner of *gracilis*. The plant is smooth-leaved and glaucous, roots tuberous and fasiculated, leaves pinnated and divided; flowers, small, numerous, pale-lilac, purple-lilac or white, with a golden disc. This species is also known as *D. Merckii* and *D. Lehmanni*. It has a very novel and striking appearance.

Dahlia Juarezii or Cactus Dahlia.—This is also known as the Dahlia Zurezii. It is one of the most brilliant and striking of all known species of Dahlia, and is likely to introduce considerable changes in the character and colour of our more common varieties. The colour is the most brilliant scarlet, having more of the glow of the poppy than the *Dahlia coccinea*, or others of the very brightest strains. It has been called the Cactus Dahlia, as the flowers at a distance are thought to resemble those of the brilliant cactus *Cereus speciosissimus*. The florets all lie flat, the one overlapping the other, like the rays or outer florets of *coccinea* and other species. The flower stems are rather short, and do not raise the flowers sufficiently above the leaves. It seems to have been introduced from Mexico about 1874, and to have been named in honour of the President of Mexico at that time, Sig. Juarez. It was first exhibited in England in 1879.

There are several other species of Dahlias, such as *Barkeriæ Maximiliana*, &c., that are either merely known to Botanists or by their names only, and are not in commerce. The former of these was thought to be perhaps an intermediate species between the two or three Dahlias about to be noticed, having something of the foliage of the one and the flower of the other; but this is uncertain. A dwarf dahlia however, with campanulate flower heads, like those of *Imperialis*, would prove a great acquisition.

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Dahlia arborea (*excelsa*).—This grand Dahlia seems to have been introduced into English gardens a good many years ago and to have disappeared. It grows from 5ft. to 10ft. or higher according to position, &c. It, like *Imperialis*, flowers late, the blooms being rose-purple or lilac in colour, and more of the form of anemones or pyrethrums than ordinary Dahlias. The flowers are also produced in great quantities in a low temperature.

Dahlia Imperialis is unlike the general run of Dahlias. It was little wonder that Dr. Regel was incredulous when he figured and described this gigantic Dahlia, introduced from Mexico by Mr. Roezl in 1863. It is obviously of a similar type to *D. arborea*, though really a far grander plant. Whether it is an original species, or a wonderful break under domestication in Mexico, we have no means, of deciding. The plant rises to a height of 12ft. or 15ft. The tubers, stems, and leaves differ little if at all from other Dahlias, unless in size, but it carries its flowers on large spreading panicles from 3ft. to 5ft. across, and these again bear hundreds of white drooping bell-shaped flowers, each like a miniature white lily in size and form as different as well can be imagined from the flat disc-like simple Dahlias. The inflorescence is, in fact, more like that of a Yucca than a Dahlia. Two or more varieties of it are in existence, differing chiefly in the breadth of their petals and the depth and intensity of the crimson spot at their base.

D. viridiflora or green Dahlia deserves a word of notice, though our florists would hardly thank us for green sepals among their brilliant colours, nor even green ray petals as a refreshing super calyx to cool the dazzling brilliancy of many of their show or fancy flowers.

It may safely be inferred that upwards of five hundred named varieties are now in cultivation, and these are but a mere tithe of what has existed or does exist. There are yearly thousands of seedlings alone on trial, and the number of single Dahlias is beyond all computation; variety and improvement promise to flow on and on for ever. Hardly a name found in the catalogues of forty, twenty, or even ten years ago is to be found there now. Perhaps few flowers, with the exception probably of the tulip, have risen to greater commercial importance than the Dahlia. It is hardly too much to affirm that fortunes have been made and lost in its commerce and culture.

(To be continued.)

THE LIFE OF A PLANT.

BY THOMAS STEPHENSON.

Although the study of vegetable physiology is not directly connected with pharmacy, it is, nevertheless, of considerable interest to all who care to pursue the study of botany a little farther than it is absolutely necessary to do in order to pass their examinations.

It is not my intention, gentlemen, to describe the elementary principles of botany, which I presume you are already well acquainted with. And I wish tonight to enter into the processes of plant life in greater detail, and also to view them in the light of the most recent researches.

The simplest form of growth is that which is seen in the formation of crystals. In this case the growth consists simply in the apposition of fresh particles in a definite direction. Plant growth, however, is very much more complicated, though the apparent causes are very simple. When a seed is put into the ground, we expect that from nothing but air, earth and water, it will grow up and form a perfect plant. If we examine any ordinary seed, such as a bean, we find that it consists of an embryo plant and two fleshy lobes. These latter are called the cotyledons, and contain enough of nourishment stored up to give the young plant a start in life. If the seed be planted, the young plant begins to grow, sending a root downwards, and a stem and leaves upwards, while the cotyledons gradually die away. Its patrimony being exhausted, the plant must now live on its own account, and manufacture its own tissues from all the nourishment accessible to it, viz., air, water, and any soluble matter which the water may dissolve out of the earth. It is this process of nutrition which we have to consider tonight; and as the nutrition of the lower plants forms a special study in itself, I shall confine myself to the higher dicotyledonous and monocotyledonous plants. In a typical plant, the root absorbs water containing mineral matter in solution from the soil. This nutriment is conveyed to the leaves and other green parts of the plant, where it meets with carbon dioxide from the atmosphere; the CO_2 and HO_2. react, forming starch and giving oxygen back to the air, while the assimilated substances are conveyed to all parts of the plant for nutrition.

In considering the subject in detail, it will be necessary to consider; first, the food required; second, the means of obtaining this food; third, the processes of assimilation and respiration, and lastly, the influence of external conditions on the vital processes.

1. *The Food*.—The food required by a plant can best be ascertained by an analysis of the plant itself. If a plant be dried at a gentle heat so as to expel all the water it contains, we find that it loses from $\frac{3}{4}$ to $\frac{5}{6}$ of its entire weight, so that water must be the most predominant constituent of plants. If we take the dried plant and burn it, we find that it disappears entirely, with the exception of a very small and varying percentage of ash. Tobacco smoking forms a practical illustration of this.

Chemical analysis shows that the combustible portion of all plants consists of carbon, hydrogen, oxygen, nitrogen, and sulphur, this last remaining in the ash in the form of sulphates. The ash consists of salts of potassium, calcium, magnesium, iron and phosphorous, generally also sodium, silicon and chlorine, and in marine plants, iodine and bromine. Leaving the water therefore, for the present, out of the question, we may conveniently class the chemical constituents of plants under two heads, viz., the organic or essential elements, C, H, O, N, and S, and inorganic or accidental elements, represented by the ash. Cellulose, of, which all plants tissue is composed, is made up of carbon, hydrogen and oxygen, being in fact identical in composition with starch, into which it can be converted by treatment with sulphuric acid, so as to give the characteristic blue reaction with iodine. This cellulose forms as it were the skeleton of the plant. The living part of the plant consists of protoplasm, which is an albuminous body consisting of carbon, hydrogen, oxygen, and nitrogen with sulphur.

Carbon is the most abundant element in plants, consisting of about one-half the entire weight of the dried substance. It is obtained almost exclusively by the decomposition of the CO_2 of the atmosphere in the cells which contain chlorophyll, a process to be explained later on.

Hydrogen enters into the plant in combination with oxygen, as water, and possibly also with nitrogen as ammonia.

Oxygen is taken into plants both in combination with carbon as CO_2 and hydrogen as water.

Nitrogen is not obtained from the air, but must enter the plant in the form of nitrates, or an ammoniacal salt. (The manner in which nitrogenous compounds are obtained by carnivorous plants has already been treated in an able paper on that subject by Mr. Duncan.)

Sulphur is probably taken up as calcic sulphate, which is decomposed by the oxalic acid always present in the plant (caused by the oxidation of the woody tissue) forming the crystals of oxalate of lime, so commonly seen in plants, the sulphuric acid thus liberated giving up its sulphur in the production of albuminoids. The inorganic constituents of plants must now be considered. These are more numerous than the organic, and, though they do not enter into the composition of the vital parts of the plant, are, nevertheless, absolutely essential for the carrying out of their various functions, it having been found by actual experiments that growth is imperfect, and sometimes impossible, without the presence of a certain proportion of inorganic salts. The most important inorganic elements which enter into the composition of plants are potassium, iron, magnesium, calcium, phosphorus and chlorine, and sometimes sodium and silicon. The part which potassium plays in the vegetable economy is as yet but little understood, but it is considered to be essential in the formation of starch by the chlorophyll. Deliquescent salts of potassium are also often present in the cell sad

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to prevent evaporation. A certain quantity of mineral ash, consisting largely of potassium salts, has been found to be absolutely necessary in green parts of the plant, for the proper carrying out of the functions of the chlorophyll, but like many other known facts in science, the reason of this has not yet been satisfactorily explained.

Iron has been found to be necessary for the proper formation of chlorophyll, it having been observed that plants which have become pale, may, like human beings under similar circumstances, have their colour restored by the administration of some preparation of iron, and that no green colour can be produced without the presence of iron in the soil. The cause of this is, however, unknown.

Magnesium and *Sodium* also appear to be essential elements, although no special function has at yet been assigned to them.

Silicon is to be found in the stems of such plants as grasses, and in the cell wall of diatoms, in which the function appears to be the stiffening and strengthening of the parts. It is doubtful, however, whether or not silicon is really essential to the plant, as plants are known to be perfect without the presence of silicon, and the prevailing opinion appears to be that its presence in plants is, to a great extent, at least, accidental.

Chlorine has been found to be present, but as plants can grow equally well without it, it is probably accidental also.

Iodine is also found in sea plants, which form one of the chief sources of that substance.

Fluorine is also supposed to be present, as it is found in herbivorous animals.

Phosphoric Acid appears to stand in a certain relation to the production of albuminoids.

Calcium seems to act as a vehicle for sulphuric acid, and also for precipitating the oxalic acid continuously being formed, and which is injurious to the plant. It is thus that crystals of oxalate of lime are so abundant in certain parts of the plant. When plants are grown in fluids which contain all the substances essential for their life, it is found that the substances in solution are not taken up indiscriminately, but that different species of plants supply their wants in different ways. Plants, therefore, appear to have the power of selecting for themselves the substances necessary for their growth. Leguminosæ are specially dependent on lime, potatoes and turnips on potash, and cereals and grasses on silica.

It is on this fact that the principal of rotation of crops is founded. During one year, a certain kind of grain exhausts the soil of its own inorganic materials, requiring next year a crop which feeds on different salts, and so on until the soil has again been replenished from other causes.

The system of manuring also depends on the principle that plants require different inorganic salts to feed upon.

2. *The Manner in which this Food is obtained.*—The organ which is chiefly concerned in the nutrition of the plant is the root. This organ may be defined as that part of the plant which fixes it in the subtratum from which it derives nourishment. This definition does not apply in both particulars to all plants, some roots, as those of seaweeds, being solely for fixation, and some, as in the duckweed, simply for nutrition. We have, however, at present to deal with only the nutritive functions of the root.

In most text-books it is stated that absorbtion takes place only at the tip of the root, which has, on that account received the name of "spongiole." It has since been observed that this spongiole now called the "rootcap," acts simply as a sheath to protect the growing point which lies immediately behind it. It is the hairs on the epidermis of the root, and these only, which take in nourishment. These hairs are outgrowths of the epidermal cells, and, like all other cells, are filled with protoplasm and cell-sap. Being very delicate, these hairs are easily affected by gravitation, so as to lie alongside all the particles of soil in their vicinity. The moisture adhering to these particles of soil is absorbed into the hair through the thin cellulose wall, by a process known as endosmose. This process is based on the fact that when two liquids of different densities are separated by any thin organic membrane they tend to change places, the less dense liquid passing through the membrane proportionately faster than the denser one. In the case before us we have the water in the soil separated from the more dense cell-sap by the thin membrane of the root-hair, and thus by the law of endomose the water enters the root-hair more quickly than the cell-sap comes out. The water thus absorbed contains, in solution, the various inorganic salts necessary for the life of the plant. Carbonate and sulphate of lime and other salts, insoluble in water, are dissolved by the oxalic acid which is always present in the cell sap, from causes already mentioned, and are thus absorbed. In aquatic plants, as the greater part of the plant is entirely surrounded by water, it requires few, if any, special organs for the absorption of fluid. The roots are therefore either rudimentary or entirely absent. In the duck-weed, for example, the root consists of single long threads, furnished with a root-cap at the end. Absorption takes place from the whole surface of this root, there being no root-hairs. The roots of some orchids which grow on the branches of trees never touch the ground, but derive all their nourishment from the air. Such plants are called "epiphytes." The outer cells of the root are called "velamen," and have the property of absorbing watery vapour from the air. That class of plants called "parasites" also deserves passing notice. These do not derive nourishment from the ground, but get it from a "host." Take, for example, a plant which will acquire great importance in society during the next few weeks—the mistletoe. This, however, is only a partial parasite, because, having green leaves of its own, it requires to take in from its "host" only water containing mineral matter in solution, this sap being elaborated in the leaves. The root is of peculiar construction, one tap-root descending directly into the wood, while two lateral adventitious roots lie along between the wood and the bark.

The dodder is, perhaps, the best example of a parasitic plant. Unlike the mistletoe, it spends part of its life growing in the ground in a normal fashion. In this state it consists of a root and a long slender stem, the end of which gropes about till it finds a plant (preferably clover) to which it fastens itself, and at the expense of which it lives all the rest of its life, the other part of the stem, together with the root, dying away. When the stem finds a host, it coils round it and sends out brush-like roots to the bast of its host, whence it derives nourishment; in this case, however, fully elaborated and ready for use. When its host dies, the dodder finds its way to another, and often spreads so rapidly as to ruin a whole clover field in a short time.

Having considered the manner in which the fluid is absorbed by the root, we must now consider how it is to be conveyed to the various parts of the plant. We have already seen, that about 75 per cent by weight of the plant consists of water, and that, without that element, life is impossible. In many plants there is also a continual loss of water from the leaves by evaporation. To meet these requirements it is therefore necessary that currents of water should continually pass through the plant in all directions. The old theory of "ascending and descending sap" is therefore untenable, as the sap has to go wherever it is required, which is sometimes up, sometimes down, and sometimes in a lateral direction, finally passing out of the plant in the form of vapour by "transpiration." The causes of these movements are chiefly capillarity and endosmose, but there is also a process of suction caused by the evaporation of water from the leaves, and also another force called "root-pressure." When the roots absorb more water than the plant requires, this exercises a pressure which drives the water further up the stem. This water exudes on the margins of the leaves, and as it often gathers on the leaves during night, it is frequently mistaken for dew in the morning. The phenomenon of bleeding, which is seen in trees which have had their branches cut off in spring, is owing either to root-pressure, or to the expansion of air in the plant, caused by variations in temperature, thus driving out the water wherever there is an outlet.

We have now arrived at the most important part of our subject, viz., the processes of assimilation and metastasis. Assimilation is the conversion of the crude materials into substances, such as starch, which may either be used at once for the nutrition of the plant, or stored away for future use. Metastasis is the conversion of these "reserve materials" into new cells, and also into what are called secondary products, and are of no further use to the plant, such as alkaloids, resins, volatile oils, tannin, gums, etc. While the process of metastasis can take place under any circum-

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stances, that of assimilation requires special conditions for its proper fulfilment. These conditions are—(1) the presence of the green-colouring matter called chlorophyll; (2) sunlight. Any green part of the plant, therefore, which is exposed to light is capable of assimilating, or, in other words, of manufacturing starch from the crude materials. The leaves, however, are the organs chiefly devoted to this purpose, their various parts being specially adapted for this.

The outside of a leaf is covered by a thin layer of cells called the epidermis. This layer contains no chlorophyll, and, therefore, does not manufacture ; it simply acts as a protective, and prevents undue evaporation. The epidermis is provided with openings called "stomata," for the entrance of the carbon dioxide in the air, the carbon of which the plant assimilates, giving back oxygen —a process to be detailed later on. Each stoma consists of two crescent-shaped cells called "guard cells." By a peculiar arrangement, which I have no time to detail, these cells separate from one another during sunlight, and come together again in the dark, and thus the stoma opens and closes. These stomata are usually situated on the under side of the leaf. The middle portion of the leaf consists of cells containing chlorophyll. The cells near the upper surface of the leaf, and consequently nearer the light, have more chlorophyll, are long in shape, and are arranged side by side in rows very suggestive of the title given to them of "palisade cells." The cells below these are arranged more loosely, so as to allow free passage of air, and also the evaporation of water, in order that the inorganic salts necessary for assimilation may be more abundantly deposited. These cells are called "spongy parenchyma."

A closer look will show that the chlorophyll is not diffused throughout the cells, but is arranged in round granules. Each granule consists of a network of protoplasm, in which the green chlorophyll is embedded. It is the protoplasm which does the work, the green chlorophyll acting only as a shade to protect it from too intense light.

It remains for us now to consider briefly the influence of external conditions on plant life. It is well known that plant growth can take place only within certain temperatures. The lowest of these is 0° C. (32° F.) at which the water freezes, and the highest is form 40° to 50° C. (about 120° F.) at which temperature the albumen coagulates. Some plants, however, in which the water is protected, can live while the temperature is below the freezing point; and some bacteria have been seen to live in boiling water, having apparently incoagulable albumen.

From 20° to 30° C. (75° F.) is the best temperature for plants to live in. The annual rings in wood are a good example of the effect of external conditions. Owing to variations of heat, food, etc., the cambium works at greater pressure towards the end of the year, thus producing denser wood. Any number of rings can be artificially produced in one year by simply tying a ligature round the stem, and alternately tightening and loosening this ligature. The action of light on vegetation has already been considered. The effect of gravitation on a plant is a tendency to grow downwards. To counteract this influence, many contrivances are present in the stem, such as the firmness of the wood, the uniform distribution of foliage and branches, climbing appliances such as tendrils, and, in many water plants, air-bladders. Owing to the great variety of conditions to which they are exposed, all plants possess a certain power of adaptation to their external conditions.

There are two forces which I have time to allude to only very briefly. These are heliotropism and geotropism. Heliotropism is the force which makes the stem grow upwards; geotropism that which makes the root grow downwards. Light and gravitation combined seem to be the chief causes of these phenomena. But I must refer you for further information to Darwin's exhaustive work on the subject.

After this short sketch of what is already known on the subject, you will see that a vast deal remains yet to be discovered, much of which is of great interest to pharmacists, and the discovery of which might with advantage be undertaken by pharmacists themselves.

Almost nothing, for example, is as yet known about the formation of alkaloids; whether they are really useful to the plant or merely accidental, can only be conjectured.

It is known from experience that plants possess more therapeutic activity at certain periods of their growth, but the discovery of a scientific law, which would enable the cultivators of medicinal-plants to bring these plants to the greatest perfection remains yet to be made, this is only one of the many as yet unsolved problems, the working out of which wouldform an interesting and profitable study, and would prove that botany, however, much it has been condemned for its predominanceof hard names, is one of the most interesting departments of natural science.—*Pharmaceutical Journal.*

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Extracts.

INSECTICIDES.

In the primitive condition of the country, as the white man found it, insects, doubtless, took their proper place in Nature's economy, and rarely preponderated in any direction to the injury of the wild plants, scattered, for the most part, sparsely throughout their range. Harmony between organisms in the sense of the widest inter-relation and inter-dependence, had resulted in the long course of ages. But civilised man violated this primitive harmony. His agriculture, which is essentially the encouragement and cultivation, in large tracts of one species of plant to the exclusion of others which he denominates weeds, gave exceptional facilities for the multiplication of such, insects as naturally fed on such plants. In addition to this inevitable increase of species thus encouraged, many others have been unwittingly imported from other countries, chiefly through the instrumentality of commerce with those countries ; for it is a most significant fact that the worst weeds and the worst insect pests of American agriculture are importations from Europe. Thus, in addition to the undue increase in our native species, as above noted, we have to contend with these introduced foreigners, and it is no wonder that Dr. Fitch declared America to be the land of insects, for, as compared to Europe, we are truly bug-ridden. As I have stated (*Encyclopedia Americana*, "Agricultural Entomology"):—"The losses occasioned by insects injurious to agriculture in the United States, are, in the aggregate, enormous, and have been variously estimated at from 300,000,000 dols. to 400,000,00 dols. annually. It will never be possible to fully protect our crops from the

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ravages of the many species that injuriously affect them: but it is the aim of the economic entomologist to prevent as much of the loss as possible, and at the very least expense. To do so effectually the chief knowledge required is of an entomological nature, *i.e.*, the full life history and habits of the different species; and this implies a great deal of close and accurate work in field and laboratory. By means of it we learn which species are beneficial, and which injurious; and the ability to distinguish between friend and foe is of the first importance in coping with the latter, for it is a notorious fact that the farmer often does more harm than good by destroying the former in his blind efforts to save his crops.

The economic entomologist, to do effectual work, must possess, not merely a knowledge of the particular injurious species and its habits with which he wishes to deal, but must study its relations to wild plants as well as to the particular cultivated crops it affects. He must also study it in its relations to other animals. Indeed its whole environment must be considered especially in connection with the farmer's wants, the natural checks which surround it, and the methods of culture that most affect it. The habits of birds, the nature and development of minute parasitic organisms, such as fungi, the bearing of meteorology, must all be considered, and yet, with the knowledge that a study of all these bearings implies, he will frequently fail of practical results without experiment and mechanical ingenuity."

Mere study of [insects] however, while essential, is not often productive of those important practical results which follow when it is combined with field work and experiment by competent persons and upon scientific principles. Many of the remedies proposed and recommended in the agricultural Press are either ridiculous or else based on misleading empiricism; and economic entolomogy, as a science, is of comparatively recent date.

Insects probably outnumber in species all other animals combined, some 350,000 having already been described, and fully as many more remaining yet to be characterised. The proper and conscientious characterisation of a genus or species of some microscopic creature involves as much labour as that of one of the higher animals. Of the above number a goodly proportion are injurious to cultivated crops. Lintner recently records no less than 176 affecting the Apple.

INSECTICIDES.—Of insecticides any number of substances have been recommended, and many of them tried with more or less satisfaction. Of these may be mentioned lime, sulphur, soot, salt, wood-ashes, corrosive sublimate, naphtha. naphthaline, turpentine, alum, carbolic acid, phenyle, cyanide of potassium, blue vitriol, ammonia, alkalies, benzine, vinegar, sulphuric acid, quassia, vitriol, (the sulphate of copper), hot water, &c. Most of these may be safely used for specific purposes, either dry, in liquid, or in vapour; but the three most useful insecticides of general application in use during the early days of economic entomology in this country and up to within a few years, were undoubtedly tobacco, white Hellebore, and soap. Tobacco-water and tobacco-smoke have long been employed against aphides and other delicate insects, and are most useful. A quite recent advance in its use is by vapourising The vapour of nicotine is most effectual in destroying insects wherever it can be confined, as in greenhouse. Thus the boiling of tobacco in such a greenhouse is as effectual as, and less injurious to the plants than, the older methods of syringing with a decoction, or of fumigating by burning; while experience by Mr. William Saunders at the Department of Agriculture during the past two summers shows that the vapour gradually arising from tobacco-stems strewn on the ground and regularly moistened is likewise effectual. White Hellebore, either dry or in liquid, has long been one of the most satisfactory insecticides against Tenthredinid larvæ, otherwise known as false-caterpillars, of which the imported Currant-worm (Nematus ventricosus) is a familiar type; while soap, syringed in strong suds, will kill some soft-bodied plant-destroyers, and when used as a paint on the trunks of trees, is an excellent repellant against the parents of different borers. Transcending in importance, however, any of these older insecticides are the three now most commonly used because most satisfactory. They are:—(1) arsenical compounds, (2) petroleum, and (3) Pyrethrum. The first act through the stomach, and are effectual chiefly against mandibular insects; the second and third act by contact, and are, therefore, of more general application, affecting both mandibular and haustellate species.—*Gardeners' Chronicle.*

THE FRENCH MUSHROOM TRADE.

The epicure who enjoys so much a *croûte aux champignons* does not dream of the amount of work which has been gone through in order to gratify his tastes. There are in the neighbourhood of Paris from 250 to 300 Mushroom growers, who live underground at a depth of from 60 ft. to 100 ft. below the surface This subterranean world is reached by shafts furnished with upright ladders, up and down which the labourers are constantly passing. It is also down these shafts that the manure for the beds is thrown, and when spent it is sent up again in buckets by means of a rope and pulley. In some of the galleries the labourers can work upright, but there are others which are barely 4 ft. high. In these latter the labourer is obliged to work half doubled or on his knees, pushing his wheelbarrow full of soil or manure before him in the same posture. He also has to look after the beds and gather the Mushrooms lamp in hand, and work his way cleverly along the narrow paths between the beds, many of which are barely 8 in. or 10 in. in width, without once straightening himself. When the beds are made, trimmed, and "soiled," the watering has to be regularly performed, no easy task when it is remembered that every drop of water has to be brought to the foot of the shaft from above and then carried by hand along the galleries often to the distance of 600 ft. or 900 ft. The life of the Mushroom grower is really a hard one, and the mushroom eater, while swallowing his dainty productions, rarely gives him sufficient credit for his effects. It is not all profit either for his employer. First of all, he has to pay a heavy rent for his quarry, from £6 to £24 per month, according to its size. The cost of the manure and its transport form a large item of expenditure, and his crops very often fail through one or other of the causes detailed above. Luckily for him, the Parisian epicure is excessively fond of Mushrooms, so that, profiting by this amiable weakness, the Mushroom grower often manages to bring up and educate a large family, and yet be able to lay something by for old age. We know one Mushroom grower who owns property in Paris, but all his brethren are not so fortunate. The daily production of Mushrooms in and around Paris may be reckoned at 25,000 kilogrammes (about 25 tons), which at 1 fr. per kilogramme gives 25,000 fr. or £1000 per day, or close upon £400,000 per annum. The whole produce goes to the market, to the preserved vegetable manufacturers, or to the provinces. Formerly Mushrooms were sold in the markets in sieves or small flat baskets. M. Bourget, of the Rue de la Petite. Truanderie, agent and manufacturer of preserved provisions, was first to introduce the system of selling them by weight. His firm uses over 200,000 kilogrammes, *i. e.*, 200 tons, of Mushrooms per annum, either for preserving or for sending into the country. His country orders for fresh Mushrooms often reach as much as half a ton per day. Growers make special arrangements with preserved vegetable manufacturers at a price all round of from 120 fr. to 125 fr. per 100 kilogrammes, *i. e.* from about £2 to £2 10s. per cwt., the contracts being for six months or a year. In the markets they are sold by auction as they arrive. Mushrooms are sent into the provinces in baskets holding from 15 kilos. to 20 kilos. They are carefully packed in hay or straw, so as to keep them from breaking or chafing. The baskets are carried in special vans, which travel the whole distance, so that there is no need to disturb the baskets during the journey. A few figures will give an idea of the importance of the Mushroom growing trade of Paris and its neighbourhood. M. Gérard, a grower at Houilles and the quarries near St. Denis, employs nineteen horses and fifty labourers. His daily expenses amount to 500 fr. (£20) He has 8000 metres (4 miles 160 yards' run) of Mushroom beds in his different quarries. M. Renaudot, of Méry-sur-Oise, occupies the most important Mushroom quarries of this district. He receives from Paris a vanful of manure every day, or about 390,000 kilogrammes (300 tons) per month. He has 3500 metres (a little over two miles run) of beds, and sends 18,000 kilogrammes (18 tons) of Mushrooms to the Paris markets every month. We may also mention M. Poussart, at Gouvieux, in Picardy, who employs ten horses and thirty workmen; M. Monin, at Les Moulineaux, ten horses and ten workmen; M. Brique, Paris, two horses and eight workmen; M. Moutin, Paris, ten horses and thirty workmen; M. Victor Grillet, at Vitry has two horses and six workmen. He has 12,800 metres (about 6 miles' run) of beds in his three quarries. MM. Gardien, at Vendôme; Busse, at Saumur; Balocbe, at Caen;

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Dupuis, at Lille, produced large quantities for the supply of their own districts. In order not to be troubled with the details of the daily sales, the larger Mushroom growers make contracts for six months or a year with one of the agents of the markets. The agent engages to take the whole crop at from 100 fr. to 125 fr. per 100 kilogrammes (£2 to £2 10s. per hundredweight) according to the season, for the price of Mushrooms falls sensibly when the new year's vegetables begin to arrive in the market. The Mushroom grower, on his side, guarantees a certain minimum of production, and binds himself not to sell to other agents. There are in Paris fifty agents who have the monopoly of this trade, and who supply the greengrocers' shops and restaurants, the stalls in the markets, the manufacturers of preserved vegetables, and, to a certain extent, the provinces.—M. LACHAUME.

IMPROVING LIGHT VEGETABLE SOILS.

One way of dealing with light soils in dry seasons is to mulch them with such material as can be purchased at an inexpensive rate, and laid up for the purpose during the winter and early spring months. Light stable litter—which is cheap enough even if it has to be purchased, but which is common enough about most gardens—will answer the purpose well if it be turned over a few times during the winter and mixed with other manurial refuse, such as spent hotbeds and similar material, which, having lost the greater part of its nutritious elements, is of little use, except for surface dressing. All such spare refuse being collected together and incorporated well with each other will make capital material for encouraging surface roots and protecting them from the unhealthy action of parching weather, as well as retaining the natural moisture of the soil. It is a fact but too well known that light, porous soils—although their condition is improved by mulching—require considerably more labour than that of mere surface dressing to make them productive and capable of sustaining good crops in dry seasons. Having succeeded in improving a portion of the kitchen garden here, which is naturally of a poor, sandy character, the plan which we adopted may be of benefit to others. I may state that during the alterations here we came across several veins or beds of yellow clay, which was in due course removed to an out-of-the-way corner near the portions of the garden where it was required to be used. As the crops were gathered the clay was wheeled on to the surface of the ground and spread regularly over it to a depth of 6 in. It was thus exposed to what frost we get in winter and the action of the weather generally till spring, when the ground was dug over in the following way: An opening was taken out at one side of the plot, and thick layer of cow manure, the best that could be procured, was put in the bottom of the trench; on this the layer of clay was laid, and the soil was dug to one spade's depth and laid over it; this was repeated till the work was completed. Before cropping commenced in the spring the ground was deeply forked over, the object being to work the clay and the ordinary soil as much together as possible. That year such crops as Peas, Broad Beans, Cauliflowers, and Brussels Sprouts were greatly improved, but of course the experiment was as yet only half tried. During the following autumn we kept burning clay and every other rubbish that was within easy reach, such as Pea straw, old Pea rods, thinnings of plantations, and stumps of trees—anything and everything, in fact, that could be converted into wood ashes. The clay fires were kept going for months together till the winterly rains drowned them out, the wood ashes and burnt clay being spread over the surface as the unburnt clay was the year previous. In addition to this all the decomposed vegetable matter that could be collected together, as well as the surfacings of fruit borders that were being renewed, and worn-out potting soils, were all utilised to swell the heap of ingredients, which in process of time accumulate to no inconsiderable bulk. These soils were likewise spread over the same plot of ground, which was ridged up last winter without the addition of manure. In the spring the ground was again forked over thoroughly, and this time the operation of mixing the soils was accomplished more satisfactorily than before, from the fact of there being no manure worked in that would impede the process of incorporation. When the land was in the best of order a dressing of short manure was given, and the surface made fine before the seeds were sown. The ground was chiefly cropped with Peas, Broad Beans, and other vegetables intended for exhibition, and the results, especially as regards Peas, were such as to inspire one with confidence as to what can be done in the matter of improving light soils. We have never had such crops of Peas before, the quality being in all respects excellent and the yield something extraordinary, the pods being of a fine size; but perhaps the most remarkable feature of the whole was the beautiful green colour of the pods and the dense gloom, a result which I attribute solely to the application of burnt clay and wood ashes. I have used both these substances for fruit-growing purposes largely with the best results, and the elements contained in them seem eminently adapted to vegetable culture as well. In preparing land for future crops, I would recommend that each plot be set apart for its own particular purpose, and prepared accordingly. It is also necessary that prepared soils, composed of several parts of clay, should be turned up to the influence of the weather early in the season; for instance, land that will be required for summer crops of Peas, Beans, and Cauliflowers will be improved by being dug over and manured as the crops are cleared away. In digging the ground it is advisable that all added or rich matter be kept near the surface, and that no bad subsoil be disturbed, except to remedy defective drainage. When the opening is taken out, a shallow trench, 1 ft. or so in width, will be sufficient. The layer of manure is laid on the bottom and covered over with 3 in. or 4 in. of the surface soil turned bottom side upwards; then the soil is turned over to one graft in depth and laid angle-ways roughly across the trench. This plan I consider an improvement on the old ridging system, as every spadeful of soil is fully exposed to the weather during winter, causing it to become thoroughly pulverised before sowing or planting takes place in the spring.—*The Garden.*

INSECTS AND AGRICULTURE.

Petroleum, in its various forms, has long been recognised as one of the most effective insecticides in our possession, all only substances being particularly deadly to insects. Unfortunately they are also injurious to plants, and one of the problems, the solution of which I have had in mind for many years, has been their use in such dilution as to kill the insect without injury to the plant. Refined kerosene has been used to a limited degree by forcible attenuation in water and spray, while some plants withstand doses of the pure oil. But the safe and general use of kerosene for the purpose under consideration dates from the year 1880. Of the various substances used in attempts to emulsify and mix kerosene with water none are more satisfactory than soap and milk, both being everywhere accessible and cheap. Milk was first suggested in 1880 by Dr. W. S. Barnard, while carrying on experiments for me against the Cotton-worm, and subsequent experiment, especially by another of my assistants, Mr. H. G. Hubbard, has given us the simplest and most satisfactory method of making the emulsion quickly and permanently. An emulsion resembling butter can be produced in a few minutes by churning with a force pump two parts of kerosene and one part of sour milk in a pail. The liquids should be at about blood-heat. This emulsion may be diluted with twelve or more parts of water to one part of emulsion, thoroughly mixed, and may be applied with the force-pump, a spray nozzle, or with a strong garden syringe. The strength of the dilution must vary according to the nature of the insect to be dealt with, as well as to the nature of the plant; but finely sprayed in twelve parts of the water to one of the emulsion it will kill most insects without injury to the plant. An equally good emulsion may be made as follows:—

Kerosene, 2 gal.; common soap, ½ lb.; water, 1 gal. Heat the mixture of soap and water, and add it boiling hot to the Kerosene. Churn the mixture by means of a force pump and spray nozzle for five or ten minutes. The emulsion, if perfect, forms a cream, which thickens on cooling, and adheres without oiliness to the surface of glass. Dilute with cold water before using, to the extent to which experience will indicate is best.

The simplest discoveries are often the most valuable, and this discovery of so simple and available a means of diluting, *ad libitum*, oil with water is important and far-reaching in its practical application.

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Pyrethrum.

Pyrethrum roseum, a plant native to the Asiatic countries south of the Caucasus Mountains, and Pyrethrum cinerariæfolium, a native of Dalmatia, have long been known to possess insecticide properties, especially in the powder from the dried and pulverised flowers. The powder, sold under various names by druggists, was chiefly used against household pests, however; and though Mr. C. Willemet, as early as 1857 in France, and Mr. William Saunders, in 1879, in Canada, tried it in powder form on some that are injurious to plants, its importance as a field insecticide did not appear till in 1880, when, in prosecuting the work of the United States Entomological Commission, we discovered that it could be used in liquid solution. Both species proved to be hardy throughout the greater portion of our country, and Mr G. N. Milco, of Stockton, Cal., has for some years cultivated cinerariæfolium quite extensively at great profit, the product being sold under the name of "Insect." The insecticide property dwells in a volatile oil. It acts only by contact, and its action on many larvæ is marvellous, the smallest quantity in time paralysing and ultimately killing. Its influence in the open air is evanescent, in which respect it is far inferior to the arsenical products; but being perfectly harmless to plants, it can frequently be used on vegetables where the more poisonous substances would be dangerous.

Pyrethrum is supposed to have no effect on the higher animals, but that is a mistake, as my own recent experience is that the fumes in a closed room have a toxic influence, intensifying sleep and inducing stupor; while the experiments of Professor A. Graham Bell with the powder copiously rubbed on a dog showed that the animal was made sick and was affected in the locomotive organs very much as insects are. The wonderful influence of this powder on insects has led me to believe that it might prove useful as a disinfectant against fevers and various contagious diseases by destroying the microbes and other micro-organisms, of forms, which are believed to produce such diseases. It should be tried for that purpose. It is remarkable that these two plants of all the many known species of the genus should alone possess the insecticide property.

Bisulphide of Carbon.

Of all insecticides to be used against root-feeding or hypogean insects, naphthaline, sulpho-carbonate of potassium, and bisulphide of carbon are the chief. Dr. Ernst Fischer, in a recent work, has shown that naphthaline in crystal may be satisfactorily used underground, destroying by slow evaporation. But bisulphide of carbon still holds the first place in France against Phylloxera vastatrix. It is conveyed beneath the ground at the rate of one-half to one kilogram per Vine by special injectors or by more complicated machinery, drawn by horses. I believe that petroleum emulsions will supersede it as an underground insecticide, and prove to be the best we have, cheapness, safety, and efficiency considered. After the discovery of a satisfactory insecticide, however, various important problems must be solved, and particularly how to apply it to greatest advantages, having safety to man and stock, harmlessness to plant, and economy in mind. The solution of these points, and others that the peculiar habits of the insect to be controlled involve, brings us to the question of mechanical contrivances and appliances; for while much ingenuity has been exhibited in devising mechanical means of directly destroying noxious insects without insecticides, it is chiefly in the proper application of these last that the greatest mechanical advances have been made both in this country and Europe. Here, again, the subject is so vast that I cannot enter into details.

It will already have been gathered, from what has preceded, that the chief insecticides are applicable in liquid form, and as liquids have an advantage over powders in field use, instruments for atomising and distributing liquids constitute the most important part of insecticide machinery. The *desiderata* in spray-nozzle are, ready regulation of the volume to be thrown; greatest atomising power, with least tendency to clog; facility of cleansing or ready separation of its component parts; cheapness, simplicity, and adjustability to any angle.

I will content myself with exhibiting one which meets, perhaps, more of these requirements than any other in use, and which works on a new principle applicable to many other purposes than that for which it was designed. It is what has been described and illustrated in my late official reports as the eddy or cyclone nozzle, and consists of a small circular chamber with two flat sides, one of them screwed on so as to be readily removed. Its principal feature consists in the inlet through which the liquid is forced being bored tangentially through its wall, so as to cause a rapid whirling or centrifugal motion of the liquid which issues in a funnel-shaped spray through a central outlet in the adjustable cap.—Prof. Riley in *American Entomologist*.

QUALITY v. QUANTITY IN PLANT CULTURE.

It is a fact well-known to all lovers of horticulture that well-grown plants, both large and small, are no rarity in this country. A visit to any of the London or large provincial exhibitions, or a glance into any large nurseryman's establishment, will prove that no pains are spared to ensure perfection of growth. In the case of those who grow for sale it is easy to understand that every effort should be made to secure a saleable article, and it is in order to facilitate this object that growers for market are apt to drift into specialities; and a man naturally concludes that if a plant pays him in a small quantity, it will pay him still better if grown upon a larger scale, and he finds that by restricting himself to certain species or genera, he is enabled to so arrange his accommodation as to meet, with the smallest amount of trouble, the peculiar wants of those plants which he may desire to cultivate. In private establishments, where variety is wished for, it is not easy to ensure to each plant those conditions which are most favourable to it. In large places, where there is much glass, the task becomes more simplified, but where there is but scanty accommodation it sometimes taxes the resources of the grower to the uttermost. There is, however, one mistake which is often committed, and that is, needlessly multiplying the number of subjects grown. It often occurs that, because a plant happens to be more than usually pretty or striking, that a good lot of cuttings are made to ensure a stock. A good strike being sometimes the result, they are all grown on until it is found that there is not sufficient space for them to develop healthfully. In that case the proper course would be to sacrifice some to ensure the future welfare of the remainder. But oftener the natural reluctance to discard anything in the shape of a healthy plant prevails; they are all kept growing on, and the consequence is a tangled and weedy growth. I have often seen houses crammed in this fashion, not a single plant showing its true character, where the weaker-constituted must eventually succumb—a true case of the "survival of the fittest." Crowding is always a bad policy, whether applied to fruit or flower culture; it is certain that whoever may practice it will inevitably pay the penalty in a diminished or inferior produce. How much more satisfactory to possess one plant, sturdy, full of healthful foliage and, if of a flowering nature, covered with a well-developed bloom, than a number of weakly, debilitated subjects none of them conveying any true idea of what the plant should really be. And then, again, if we turn to fruit culture, taking, for instance, the strawberry, the great object would often appear to be to introduce as many plants as possible in a given space. How mistaken this system is anyone may readily convince himself. Take any number of plants, and divide them into two equal portions; the one half shall stand so that they never touch each other during the growing season, the others to be allowed to intermingle their foliage to some extent. Let the produce when gathered be compared and weighed, and the evils of crowding will at once become apparent. There is one rule by which every plant grower may be guided, i. e., keep each plant perfectly free from its fellows; as, even if the full sun and light can not be admitted to each portion of it, a constant circulation of air is maintained around it, without which substance and vigour can not be maintained. Those who possess but a limited space for the shelter and growth of plant in pots should be very firm and resolute in this respect; better far to throw away a few plants (which, however, is not at all necessary, as plenty may always be found to whom the gift of a plant is a boon) than, by retaining them, run the risk of spoiling the entire collection. It often occurs that, owing to the efforts at propagation, in which most amateurs delight during

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the summer, there is at housing time some difficulty in finding proper accommodation for everything. It is then that the great mischief is committed; the plants, looking young and fresh and sturdy, are placed upon the shelves and stages in close and serried ranks. The immediate effect is, of course, charming; a bank of verdure is formed, which looks pretty well up to the time when the days come to their shortest, and inclement weather precludes the possibility of thoroughly ventilating this closely-packed mass. Then comes damping off; the under foliage in some instances dies away, and even plants of a hardier nature become so weakened that they cannot come up to time when the growing season again arrives. Many have to be weeded out and consigned eventually to the rubbish heap. How much better to have made a more vigorous selection at housing time, when each plant, getting its fair amount of air and light, would have been preserved in good health and would have been a source of real pleasure! One or two plants of a sort will as well afford variety as a larger quantity, and the smaller the amount of glass possessed the more thorough and resolute must the selection be. A collection of the most varied nature in which hard and soft-wooded plants are indiscriminately mixed, may be kept up in good health by simply attending to these rules, which will equally apply to stoves, Ferneries, &c., as to the ordinary cool greenhouse. Many of the more tender inhabitants of warm houses fail to preserve their vigour and fresh appearance during the winter owing to their not having received sufficient air and light during the growing season. In the way of bedding plants, where grown upon a large scale, it is much more satisfactory to grow sturdy, bushy plants each one of which, when planted out, is in a great measure made, and, being full of vigour and health, becomes quickly established, and makes an effect at a much earlier period than small, weakly plants could possibly do. In this, as in every other branch of plant growing, the best policy will be found to consist in systematically placing a restriction upon the quantity so that the quality may be thereby improved. —*The Garden.*

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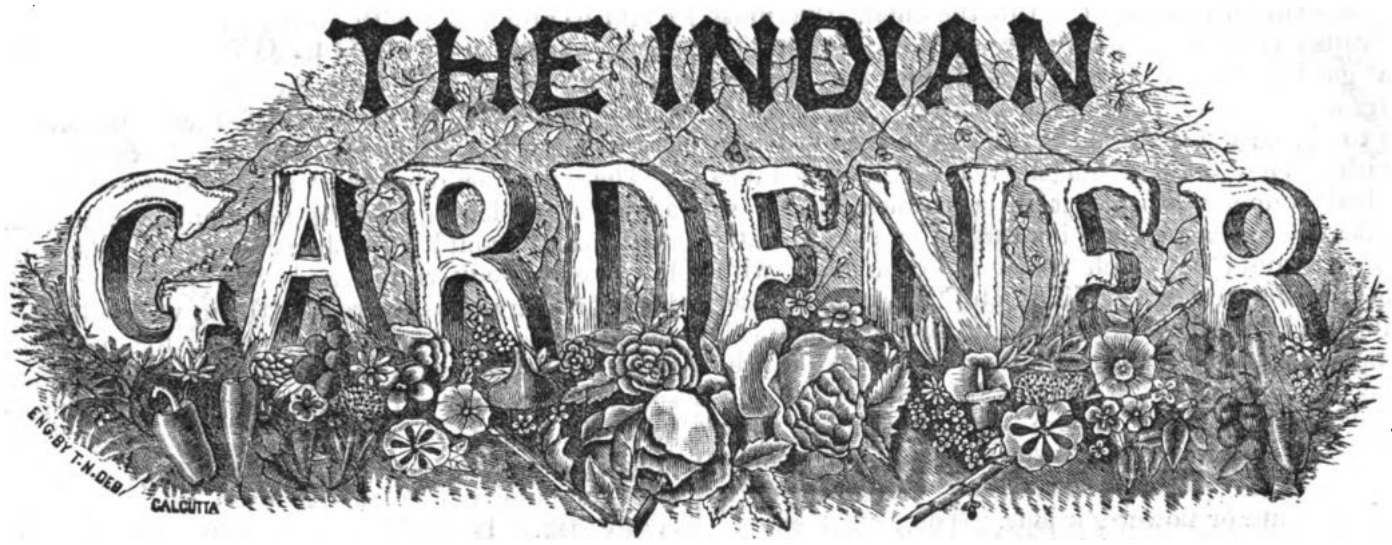

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NEATNESS AND ORDER.

NEATNESS and order should be the first law in every garden. To a large extent gardening is for pleasure. A great portion of it is not a necessity of life, although it contributes to no mean extent to its enjoyment and civilization. Hence, no doubt, the application of pleasure-ground to mixtures of nature and art which form so conspicuously the surroundings of the habitations of the well-to-do in all civilised nations. If man is to have pleasure, he must take pleasure out of pleasant things. He cannot find it in anything of a contrary character. Hence the construction of lawns, shrubberies, flower-beds, the planting of trees, the erection of conservatories and other structures for beautiful flowers; all of which are undertaken and kept up as fountains of pleasure to regale the senses and soothe the often-jaded mind. If we could with one stroke annihilate all gardening in this country, except what is kept up for profit or as a necessity of life, what a transformation scene would be the result, and what a sacrifice of much that is enjoyable and calculated to foster the best feelings without exciting the baser passions of mankind would follow. This could be done without in any way lessening the resources of the country or bringing about any pecuniary calamity, but the result would be an immense loss to mankind. A garden with the same object as that of a farm, the production alone of what we could cook and eat and make market of, might be a necessity and to some extent a pleasure too; but suppose all else which the word garden includes abolished, and how comparatively little of gardening would be left!

Well, we garden to an immense extent for pleasure, and we can only get pleasure out of pleasant things; and admitting that, to a well balanced mind order is an essential condition to its deriving pleasure from a habitation, a garden, or anything. This being the case, we do not hesitate to say that a great many gardens as they are now kept most miserably fail to answer this end. There are many places where one would never think of looking for order—a cobbler's shop for instance; but in a flower garden or pleasure garden the mind never fails to associate order, cleanliness and neatness with the very name, but it very often fails to find what it thus expects. Nor do we think we are overstating the case when we say that nine-tenths of the worry and annoyance which arises to the proprietors of gardens are the result of the want of order and neatness. Wherever art is introduced in the surroundings of a habitation, it should be of the highest order in principle, and should be carried out with scrupulous care in all its details, if it is to be a source of pleasure. Weedy, uneven and uncomfortable walks, ragged edgings, patchy and ill kept grass and flower beds, plants standing in confusion or in green slimy pots, and a garniture of decaying leaves and flowers, is no caricature, but a true picture of many gardens.

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There may be various causes for this disorderly state of things and for the unpleasant feelings that it leads to in the case of all concerned. But the chief, the most general cause is that of attempting to keep in artistic order a garden of any extent with inadequate means. Amateurs err in many instances in making their pleasure gardens too large and their conservatories too extensive to begin with. They find at length that gardening takes a good deal of money to do it in a manner capable of making it a source of pleasure instead of a sore to mind and eye. It would be much better to commence with less than they would really like, and keep that lesser extent in first rate order ; and then, if they feel inclined, extend the area, but always within the limit that can be maintained in good order.

We feel confident that we are now contending for a principle which should never be lost sight of in determining how much of any grounds should come under the designation of pleasure or flower gardens. The extent should be fixed by the means which the proprietor is able or willing to devote to such a purpose ; for it should always be borne in mind that a highly kept garden presupposes one for which sufficient labour is allowed, for it not only requires a maximum of labour, but it demands it almost incessantly. It requires no evidence to prove that this is a point that owners of gardens far too often lose sight of, and the undue extension of grounds is an error from which gardeners do not always steer clear. There can be no denying the fact that gardeners would go into their business with far more spirit and energy, and with satisfaction both to their employers and themselves, if they had sufficient labour force in all cases to keep the gardens under their care in the highest possible trim. But far too often it is the other way ; and there need be little hesitation in saying that it is difficult to point to anything else that would so much improve the whole aspect of gardens, and increase the pleasure and satisfaction of all related to them, as an adjustment of the grounds to be kept and cultivated to the means allowed for that purpose—either the grounds to be reduced and brought down to the means, or the means be augmented in proportion to the work required. We are not sure that it would matter much in the real interests of gardening which of these steps be taken to remedy the evil of disorder, and the want, of those finer touches of keeping, without which it becomes a misnomer to apply the term pleasure to our grounds or gardens.

We consider this to be a point of great moment, and worthy of the attention of all those who have in any way to do with flower gardens or pleasure grounds. An immense garden in the very highest style of keeping, is an object from which few ever withhold their meed of praise and admiration, but a smaller garden in the same high order is far more fitted to delight the mind than the largest when deficient of order and high keeping. And we do not know of any one more truly worthy of commiseration and sympathy than he who, with a naturally orderly mind, is called upon to attempt the extraction of pleasure by means of high keeping from any garden for which sufficient labour is not allowed. Then there is another point which perhaps deserves to be approached with more delicacy. It is the attempt to crowd into gardens, however small, a little of everything that can be thought of, without consideration of adaptability of situation, soil and climate. If the capabilities of a garden—as to what should be the leading features of horticulture which most befits its character, and which could be attempted with good hope of success—were more fully considered, it would be vastly better for horticulture generally than the introduction of so many features indiscriminately, where many of them can never be more than the veriest abortions.

There are few reforms that would tend so much to advance gardening to a higher standard than that individual places should be made celebrated for those particular branches of cultivation and decoration for which their peculiar characteristics render them well adapted. That certain places are superbly suited for one thing, while these same places afford the worst possible foundations for successful results in some other things, is a self-evident fact. It might be asked what it is that has so very much tended to superlative culture of one particular class or family of plants or trees, and our answer is not far to seek. It is that one cultivator has thrown the power of his resources, and turned the peculiarities of situation, soil and climate into some particular branch of gardening, and has in consequence done vastly more towards its development and progress than if a heterogeneous multitude of subjects—for few of which the place might be suitable—had divided his attention and consumed his resources. This refers with equal force to superior culture and to improved varieties.

It may not be out of place to recommend those who are about to lay out and plant for themselves gardens, to first seek the best possible advice they can obtain on the subject. Even if this advice has to be paid for liberally, it will be found the cheapest and most satisfactory course in the end. To all such, a friend who can give sound advice as to the capabilities of a garden, and direct what to avoid in one case and adopt in another, must be an invaluable adviser. If in nothing more than in selecting the varieties of fruits, shrubs and trees that are likely to give satisfaction in different soils, situations and districts, the satisfaction of having been advised with discrimination is worth very much, to say nothing of the absolute gain.

Editorial Notes.

COLOURING DRACÆNAS.—A useful aid in increasing the colour in Dracænas is crushed bones in the compost in which they are potted, and a few larger ones used instead of crocks for drainage.

TO DESTROY ANTS IN FLOWER-BEDS.—Should they have formed their nest at the root of a plant, pour upon them a quart or so of warm water, in which a moderate-sized piece of camphor has been steeped. This, it is said, effectually destroys them, and is not the least injurious to the plants.

RINGS IN THE WOOD OF TREES.—Mr. Menzies, one of the Royal keepers of Windsor Forest, says :—"I took evidence of the age of the plantations, from documents, in all cases where such could be found, and cut down several trees to test the accuracy of fixing their ages by counting their rings. I found that even where the trees are from 100 to 200 years of age there was seldom a difference of more than four or five years between what the documen-

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tary evidence established and what the number of rings would have led me to believe."

PRESERVATION OF FRUIT.—At the Russian Court fruit is preserved by being packed in creosotised lime. The lime is slaked in water in which a little creosote has been dissolved, and is allowed to fall to powder. The bottom of a plain deal box is covered with it one inch high, and over it is a sheet of paper. Upon this the fruit, well selected and cleansed, is arranged; over this another sheet of paper, and on top of this another such stratum of prepared lime; in the corners a little finely powdered charcoal is put. The whole box is then filled in this manner, and the well-fitting lid nailed down. Fruit thus kept will remain intact at least one year.

PRECAUTIONS AGAINST SLUGS, SNAILS, AND WORMS.—When putting out young plants in showery weather, some sifted ashes scattered over the surface of the beds will make travelling most uncomfortable for any soft-skinned vermin. Lime and soot are also distasteful to them, but the first shower not only neutralises their effect, but they have a tendency to clog up the pores, so to speak, of the surface-soil; sifted ashes, on the contrary, keep the surface loose and friable, and attract and absorb what little warmth there is in the sun's rays at this season. A very light sprinkling is sufficient, and the effect is permanent. Some object to the use of ashes, but for heavy soils their application in the way just described is very beneficial, and, what is more, they can be obtained in most places for almost nothing.—E. H. in *Garden.*

EXTENT OF NURSERY GROUND IN GREAT BRITAIN.—According to the recent agricultural returns compiled by Mr. R. Giffen, of the statistical department of the Board of Trade, we find under the heading "Nursery Grounds," or land used by nurserymen for growing trees, shrubs, &c., that England possesses 10,029 acres; Surrey, 1361 acres; Yorkshire, 925 acres; Kent 646 acres; Cheshire, 525 acres; Derbyshire, Essex, Hertfordshire, Middlesex, and Sussex, each between 400 and 500 acres; Devon, Lancashire, and Worcestershire, each between 300 and 400 acres; Cumberland, Gloucestershire, Somerset, and Staffordshire, each between 200 and 300 acres; and the rest of the English counties less than 200 acres each. Scotland contains 1740 acres of nursery lands; Edinburgh having 526 acres; Aberdeenshire 182 acres; Dumfriesshire, 185 acres; Forfarshire, 107 acres; Perthshire, 100 acres; and other counties less than 100 acres each. Wales contains a total of 325 acres. The total nursery grounds in Great Britain amount to 12,094 acres.

SLOW GROWTH AND DURABILITY OF A CONIFEROUS TREE.—A remarkable instance of this is recorded in the "Transactions of the New Zealand Institute," by Mr. John Buchanan. The tree in question is Podocarpus spicata, the Matai of the Maoris, a common forest tree almost throughout the island of New Zealand. Mr. Buchanan describes a prostrate trunk, which was pointed out to him in a valley near Dunedin. He calculates that the tree must have lain where he saw it at least 300 years, from the fact that its trunk was enfolded by the roots of three large trees, which must have grown from seed since its fall. The three trees seated upon it and rooting in the earth on both sides, thus holding it in their embrace, are all Griselinia littoralis, with trunks 3 ft. 6 in. in diameter. They were recently felled, and the growth rings count over 300, thus approximating 300 years.

WATERING.—The common-sense way of doing this in the open air is to pour it on the land between the crops in the evening only, giving sufficient to moisten the soil to the extremities of the roots, and the next morning scattering an inch or so of short manure, rough leaf-mould, old tan, or dry soil over the surface, having previously just loosened it up with the hoe. Where such precautionary measures for lessening evaporation are taken, once a week will be sufficient to water all crops. If watered frequently, liquid manure should be given occasionally, to compensate for the waste of manurial matters in the soil from so much water being so rapidly passed through the upper stratum; to be as rapidly evaporated again by the hot sun the following day. Never use water until it has been well exposed to the sun and air, and hoe up the surface two or three times a week. Few seem to realize the benefit derivable from a frequent stirring of the earth's surface in dry weather as a means of retaining moisture in the land and keeping the root-run cool.

PROPAGATING CROTONS.—Though Crotons are easily struck from small cuttings, where it is desirable to obtain good plants of them in a short time, the method usually adopted in the case of Dracænas and Ficus elastica may be practised with good results as regards Crotons. Any one having old straggling plants, should stop the leading shoots, and when they begin to break again surround the stems with a flower pot which has been split in two, securing the halves by means of wire or string. Fill the pot with sharp sandy soil, make a slight incision all round the stem under the pot, and in a few weeks roots will be emitted into the soil. Then gradually cut through the stem until the portion in the pot is finally severed from the plant, and when well rooted shift into a larger pot. In this way dwarf bushy plants for table decoration may be secured in three months, whereas from cuttings it would take at least two years to produce them. The old plant, which will break freely if placed in a moist heat, will make a lovely specimen, and may be used, if desired, for a further supply.—*The Garden.*

THE SACRED BASIL.—Dr. George Birdwood writes in the "Academy":—"The most sacred plant in the whole indigenous materia medica of India is the Tulsi or Holy Basil (Ocymum sanctum), sacred to Krishna, and called after the nymph Tulasi, beloved of Krishna, and turned by him into this graceful and most fragrant plant. She is indeed the Hindu Daphne. The plant is also sacred to Vishnu, whose followers wear necklaces and carry rosaries (used for counting the number of recitations of their deity's name), made of its stalks and roots. For its double sanctity it is reared in every Hindu house, where it is daily watered and worshipped by all the members of the household. No doubt also it was on account of its virtues in disinfecting and vivifying malarious air that it first became inseparable from Hindu houses in India as the protecting spirit or Lar of the family. In the Deccan villages the fair Brahminee mother may be seen early every morning, after having first ground the corn for the day's bread and performed her simple toilet, walking with glad steps and waving hands round and round the pot of Holy Basil, planted on the four-horned altar built up before each house, invoking the blessings of heaven on her husband and his children—praying, that is, for less carbonic acid and ever more and more oxygen. The scene always carries one back in mind to the life of ancient Greece, which so often is found still to live in India."

THE IRON TREE (PARROTIA PERSICA).—This member of the Witch Hazel family is a native of Northern Persia and the Caucasus, and is one of the rarest trees in cultivation. Its beauty consists in the magnificent colouration of the foliage very late in the autumn, when, except in unfavourable seasons, the leaves turn various bright colours, the principal being brilliant orange-yellow, and scarlet. Sometimes, however, as is the case with many of the American trees which usually put on such lovely autumnal tints, they content themselves with dull yellow, purple, or brown. The small flowers are rendered conspicuous by their long, spreading stamens, with scarlet anthers. The leaves, about 3 in. long by 1½ in. or 2 in. broad, are coarsely-toothed, and when young are more or less clothed with silky hairs. The position which the tree likes best, and one which, on account of its rarity and beauty, it is well worth, is a wall with an eastern or western aspect. Here its foliage remains attached to the branches much longer than when in the open ground, and, moreover, under such conditions it grows more freely. It is called "Iron Tree" by the Persians on account of its excessively hard wood. The genus, which only contains

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another species—a small Himalayan tree which has not yet found its way into cultivation—was named in honour of Prof. Parrot, who made the first ascent of Mount Ararat in 1829. From the "Botanical Magazine" we learn that the two specimens at Kew—one of which is trained against a wall, and the other planted on a lawn near the principal entrance—were received as pot plants from St. Petersburgh some thirty-five to forty years ago. In a wild state 10 ft. to 15 ft. are the heights attained; one of the Kew plants is about 10 ft. high. Layering would probably prove the easiest and most expeditious mode of propagating this very slow-growing tree.—*The Garden.*

A Mushroom Farm in the Mammoth Cave of Kentucky.—The novel proposal (the *Times* learns from the *Scientific American*) has been made by an enterprising Frenchman to the trustees of the Mammoth Cave to rent a portion of the cave for raising edible Fungi. He has been cultivating Mushrooms in the neighbourhood of New York, but complains of want of cellar space, and of the conditions of temperature and moisture as not uniform enough for the best results. The portion of the cave which he has in view is that known as Audubon's Avenue, the first passage to the right after entering the cave. It is about half a mile long, and contains little of special interest, unless it be the swarms of bats in the Great Bat Room. The rich deposits of bat guano that have accumulated there for centuries would no doubt prove serviceable, when mixed with other fertilisers, in growing the Fungi. The soil is at present very dry, but might easily be moistened to any desired degree. The idea of thus utilising caverns has long been a familiar one, and practically realised in France. One cave at Montrouge is said to have six or seven miles run of Mushroom beds; another near Frepillon, sixteen miles; a third, at Merv, over twenty-one miles. The special advantage of subterranean culture lies in the uniformity of temperature, which in the Mammoth Cave hardly varies from 56° Fahr. all the year round. Mushroom culture is found highly remunerative. It is thought choice Mushrooms would find a ready market in Louisville, Cincinnati, and other western and southern cities, not to speak of more distant markets. The project in question is thought to be regarded favourably by the trustees.

Original Articles.

THE ROSE.

New Roses.

The French as a nation are proverbially imaginative, but this trait seems to have attained its greatest development amongst the raisers of new Roses. Varieties that, if not actually worthless, at least are not equal to hundreds of the older kinds, are sent out yearly by the dozen. The glowing descriptions given of them by their raisers not only deceives the inexperienced amateur but frequently also many a staid old hand whose experience certainly should have taught him better; but no, the incessant thirst of the ardent rosarian for novelties, like the thirst of the inebriate, must be appeased by drinking again at the same fountain that has so frequently proved fatal to his happiness. This is a subject on which I can speak feelingly. For many years past I have imported almost every variety that has been introduced, averaging perhaps fifty new names yearly. I say *new names* advisedly, for many of these supposed novelties eventually turn out to be old friends in disguise, and what has been the result of my importations? Why, at the end of ten years, out of say 500 varieties obtained, certainly not more than fifty of them belong to the first class; another fifty may be described as second class; the other four hundred varieties have proved either synonyms of older kinds or miserable failures fit only for the rubbish heap;—in fact at least half of them have already found a place there. Year after year I cry out "hold, enough," when in the spring disappointment follows disappointment as the bloom of each new aspirant for fame unfolds itself and prove to be almost worthless Year after year a determined resolution is formed never to import another Rose, but to leave it in the hands of others and await the result of their foolhardiness before embarking in any more new varieties. This resolution remains unshaken all through the summer. In autumn, however, the catalogues of the Pauls, Cranston, Cant, Turner and the other mighty men of Roses commence pouring in, teeming with glowing descriptions of all the new introductions of the year. What an effect these have, not only on the nerves but on the determined resolution taken some months previously. You may have seen the same glaring description given in previous years to other varieties which have eventually turned out to be a snare and a delusion, but all this is remembered no more. Perhaps to complete our discomfiture, the catalogues of the French growers will come to hand; what glories are here displayed; every variety offered is superior to anything we have ever seen; it is *tres remarquable, tres grand specialite, forme parfaite, superbe variete, admirablement fait, variete distingue, tres brillant et d'un grand effet, magnifique variete,* and a thousand other glowing terms in that most insinuating of all languages. No mortal, at least not a devotee of the Rose, can withstand it, and the consequent result is that resolutions are thrown to the winds. Once more we brave fate, for surely she cannot be always unpropitious. Could we be brave enough to carry out the suggestion contained in the following lines we might be able to adhere to our resolutions never again to embark in novelties:—

> To grow? or not to grow? that is the question:
> Whether 'tis nobler in the mind to suffer
> The greatest torment of a gardener's life
> In poring yearly through "fat catalogues,"
> Or to take means by popping them, when sent,
> In the waste basket—to be looked to
> No more; and by doing so, to say we end
> The thirst for new and "special novelties"
> That flesh is heir to. 'Tis a consummation
> Devoutly to be wished. To grow?—To sow?
> To grow?—perchance to cram our beds and borders
> With useless rubbish. Aye there's the rub?

It is refreshing to turn from these barren lists of the French raisers to those of our own country, not so redundant in quantity, or with descriptions so charged with the overflowings of an exuberant imagination, and giving promises which are never likely to be fulfilled. English Roses have to pass through an ordeal to which the French varieties are not subject; they are submitted to the consideration either of the Floral Committee of the Royal Horticultural Society, or of the judges at our great exhibitions; they are seen by most of the Rose growers in the kingdom, and, consequently, when they are put into catalogues it is easy to see whether those description are justified

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ORCHIDS ABROAD AND AT HOME.

The following is the first portion of the paper on "Orchids Abroad and at Home," by Mr. F. W. Burbidge, Curator, Trinity College Botanic Garden, Dublin, which was read at the last meeting of the Scottish Horticultural Association, and taken by us from *The Garden*:—The remarks made by the ordinary rank and file visitors to the public gardens or floral exhibitions are sometimes very amusing. When I was employed in the Royal Gardens at Kew, years ago, a lady and little boy entered the large Fern house, and stopped to admire a group of Gymnogrammas on one of the side stages. The Gold Ferns of course took the little one's fancy. "Oh! mamma," cried he, "look! Look at the gold dust on the leaves." "Yes, my child," answered his mamma, "that is sulphur. The gardeners shake it over the plants to kill the insects that eat the foliage!" But if one remark is heard oftener than another when cultured beauty stands before the most beautiful of cultivated flowers, it is this: "Yes! they are indeed most lovely; but what a sight it must be to see them in the Tropics!" This desire to see tropical lands is the most seductive, and it has overpowered some of the most distinguish-

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ed men of our age. As an example, one need only mention Livingstone. We all know how earnestly the Rev. Charles Kingsley yearned for the sight of a winterless land; and in a book which all gardeners should read, called "At Last; or, a Christmas in the West Indies," Kingsley tells us how his life-long wish was gratified. Then we have Banks, Darwin, and Hooker, who laid the foundation of their great knowledge by travel—men who were urged on through difficulties and dangers alike by the spirit of discovery, and an earnest desire to see under what conditions vegetation existed abroad. Let me therefore, as briefly as I can, state the condition under which Orchids luxuriate in warmer lands than ours.

Orchids may first be broadly divided into earth-loving or terrestrial, and tree-loving or epiphytal kinds. Again, speaking broadly, one may say that all the most beautiful of epiphytal Orchids inhabit the region which lies between the two parallels of 30° on either side of the equator, this region being practically bounded by the isothermal lines of 70° Fahrenheit. In a word, the epiphytal Orchids form a narraw belt or zone around the world; the most beautiful of the truly terrestrial Orchids lie outside this zone. By the truly terrestrial kinds I mean Disa grandiflora from the Cape of Good Hope, Cypripedium spectabile and its allies from N. America, and Orchis foliosa from Madeira. Nature, however, is not fond of hard lines, and so she fills in her vacuum of extremes by species of a semi-epiphytal; or, if you like to put the same facts another way, we can say semi-terrestrial kinds, such as the Sobralias and Cypripedia of the west, and the Spathoglotti or Arundinas of the east. An Orchid map is simply a chart of the world's greatest heat and rainfall under another name, or in other words, Orchids are focussed as it were, near the equator, from which they radiate in a decreasing ratio to temperate and colder regions. One curious fact comes out when we follow up this radiating idea of Orchid distribution, which is this—when Orchids radiate from the line at or near the sea level in a horizontal direction, they, broadly speaking, decrease in beauty as they recede from the equator. But some secure a cooler temperature on the mountains by vertical rather than by lateral distribution, and these mountain Orchids of the Tropics, as you know, are often quite as beautiful as those of the plains. Thus, the eastern lowland Orchids, such as Phalænopsis, Vanda, Aërides, and Dendrobium, are but little more beautiful than the higher growing Pleiones, Cœlogynes, or than the Vandas and Dendrobes of the mountains. So also in the west, the Cattleyas and Lælias, and Odontoglots of the lowlands of South America, are not much, if anything, more beautiful than the Odontoglots, Masdevallias, Cattleyas, &c. of the mountain chains. Even in Europe, we find the alpine flowers often gain rather than lose in beauty by elevation, a fact which I have never seen clearly accounted for or explained.

It is by no means easy to give a clear idea of how Orchids exist naturally in the tropics; but I will clear the way by pointing out the facts that all things are very much the same as here at home, if we except, first, the climate; and secondly, the vegetation. The climate is as hot as that of our warmest glasshouses; but there is, in addition, an airy freshness not easy of attainment in hothouses. The sun heats the earth far more than with us; hence, after rain, the whole country absolutely reeks like one large hotbed. In the forest, leaf-mould and other *débris* decay so rapidly that plant food, in the shape of aërial gases is liberated in large quantities; hence vegetation is rampant on all sides. Even in what is called the dry season, though rain may be, and often is, absent for weeks together, the nightly dews are so heavy, that in the early morning every leaf is drenched with dew. By the dry road-ways the Cocoa-nut Palm, or the Betel Nut-yielding Areca rear their slender stems. There are Pitcher Plants and Gleichenias in the wet ditches, and around every little Palm-thatched hut grow fruits and vegetables, and what we call hot-house flowers, apparently wild. Here, at home, we cultivate some of these, such as Bananas and Pine Apples, by a large expenditure in labour and artificial appliances; but in the Tropics, both east and west alike, these things are grown by the humblest natives around their houses in the open air, with far less trouble and care than we must often expend on half a dozen Apple trees, or a plot of Potatos or Onions. The magic tropical growth is simply great sun-heat and excessive rainfall. What we do here at home under a few thousand square feet of glass roofing, Nature does over a hundred lands larger than our own, and in a much more complete manner.

A Tropical Forest is rather puzzling to an explorer who sees it for the first time. Familiar as he may be with hot-house botany, he will scarcely recognise the few old friends he meets in their native wilds. Tree trunks tower around one like the pillars of a cathedral. Some of these trees will be 200 ft. in height, or even more, some perhaps less, but their tops meet far overhead, and their branches interlace and form a sort of a leafy roof screen high above. In many places not even the light penetrates through the thickly woven tree tops, and in these virgin forests you may walk for miles without once seeing the sun overhead, so that in travelling a compass is used, just as if one were in a boat at sea. The rocks and earth at one's feet are carpeted with steel-blue Ferns and mossy growths, with leafy Begonias, and in wet places there will be colonies of Alocasia or other Aroids in profusion. These woods are filled with life of all kinds, bird and beast, gaudy insects, and gliding snakes, and, what to the explorer is still more annoying, with blood-sucking jungle leeches, and with those greatest of all pests in hot climates, mosquitoes. A native guide will tell you that such a locality in these forests is full of Orchids, and yet, until you know their habits and their peculiar conditions of growth, you might walk past them and not know they were there. I was surprised when I first got to Borneo because I saw no snakes; indeed, it was only with some difficulty that I could at first see them when quick-eyed guides pointed the creatures out to me. The fact is, one's eyes seem useless among so much of teeming variety until one has become accustomed to the colours and forms of things as seen under altered conditions and under sunshine, which possesses even under partial shade somewhat of the brilliancy of limelight. Nothing surprises one more than the bright colours of some leaves and the general dulness or lack of floral effect as seen in a tropical forest. Of course, when your guides and carriers have brought you the Orchids down from the tree-tops, to which they must scramble like monkeys to get them, then, of course, if they chance to be in bloom, many are strikingly lovely. But what I wish to convey to you is that, speaking generally, epiphytal Orchids make no effect, so to speak, in a tropical landscape. That they often bloom far more profusely abroad than at home is shown by the quantity of flowers produced by even small newly-introduced plants. But abroad the wind, the rain, and the fertilising insects soon make short work of their beauty. Of course one reason why Orchid flowers remain in freshness and beauty so long in our hot-houses is owing to the above elements of injury being absent. Everybody knows that if by accident an Orchid flower is fertilised by a bee or a fly or by artificial aid, then the blossom soon shrivels and fades, while the same would have endured fresh for weeks if this fertilisation had not occurred. I have observed that in the morning after heavy dews, and at all times after showers, that the ground reeks with heat and moisture, and in the forests this uprising of moisture is always taking place from decaying leaves and other *débris*, and I believe the roots of epiphytal Orchids are especially fitted to absorb atmospheric plant food of this kind, and the safest plan of supplying manurial stimulants or plant food to Orchids is by watering the floors or stages with volatile manures, and on no account do I advise the application of solid or liquid manures to the compost or roots of these plants. Nature is not an infallible guide, but she places a thin bed of rapidly decaying leaf mould under the trees on which Orchids grow, and the finest Dendrobiums I ever saw of their respective kinds were growing in a Pine pit, and I have no doubt, whatever, that their vigorous growth was in a great measure due to the exhalations of the rotten leaves and tanners' bark in which the Pine plants were plunged.

THE DAHLIA.

General Culture.

Probably no flower has received such liberal culture as the Dahlia, the first condition to its success being good soil, which should be light, rich, dry and porous. If not light; leaf mould,

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rotten manure, cocoa-fibre refuse, spent tan, smashed charcoal, coarse sand or even fine gravel should be added, which enrich as well as lighten the soil. But the better way is to choose a good soil to start with, and then improve it by the addition of some well-rotted horse manure or cowdung, the latter at least three years old, and rotted down into something like a black mould. This last is one of the very best stimulants for Dahlias, and is almost indispensable to success in heavy soils. A dry bottom is essential to success whatever the soil. The latter is of far less moment than the former, for soils may be modified or enriched almost to infinity, but a wet base will ruin the finest soil. No one should attempt to grow Dahlias in a wet untrained garden. Dahlias are greedy of water, and for that reason the ground on which they are grown should be porous and have a dry bottom, for they can only drink water up when in motion, and not when it settles round their roots in a stagnant state. After draining where needful, the ground should be trenched to a depth of 30 inches or 3 ft., for the Dahlia is a gross feeder and deep-rooting plant. A good layer of from 4 to 6 inches of manure should be trenched in thoroughly, incorporating it with the soil as the process proceeds. On poor soils it is hardly possible to overmanure Dahlias, and several inches of dung may be thrown into the bottom of the trench. All this should be done some time previous to planting, so as to afford time to allow any rankness in the manure to be destroyed or rather assimilated with the soil before planting. Having carefully prepared the ground, the next step is planting out, for which the plants need to be as carefully prepared as the ground for the plants. The best mode of planting is inserting the stakes first, the bulbous roots thus avoid any risk of staking through afterwards. Unless the soil is specially good, give each plant a spadeful or two of rich porous compost under and around it on planting. The distance apart may range from 18 in. to 2 ft. for bedding Dahlias, to 3 ft., 4 ft., 5 ft., or even 6 ft., in the case of the strongest growing show and fancy varieties. Single Dahlias may be planted two to three feet apart, or closer where they are massed into beds, as they will bear any amount of pruning. The roots should not be covered to a greater depth than 3 in. or 4 in., and the stem of the plant should not be buried at planting more than 1 in. deeper than its collar, that is, the points of divergence between root and stem at striking. The plants as they advance in growth should be made fast to the stakes, which should be 3 ft. to 4 ft. out of the ground, with a loose tie; a strip of soft matting, about a quarter of an inch wide, is best for the purpose. This should be tied firmly round the stake, and the Dahlia stem looped up to it loosely, which secures the Dahlia with sufficient firmness without cutting the stem while allowing it room to enlarge. Secondary stakes will often be wanted as the plants break into vigorous growth and are allowed to form several main limbs or branches, each of which will need independent support. The labour of staking Dahlias when grown on a large scale is so great, and the expense so heavy, that many of the leading growers now have them planted against espalier rails or fences, and train them somewhat in the manner of fruit trees. Borders too are sometimes lined off with rails at right angles at intervals of 5ft. or 6ft. These may be carried across at one uniform height of 4ft. or 5ft., or may slope from 6ft. at the back to 4ft. in the front, placing the tallest Dahlias at the back. Borders 10ft. wide will hold three plants across. The rails or wires need not be more than 9 in. or a foot apart, as small stakes or strong ties will suffice to carry the shoots across the interstices. Few plants require more careful staking and training than the Dahlia; its extreme brittleness and the rapidity of its growth demand constant care in adding and widening the ties.

Should dry weather follow planting, Dahlias need liberal and careful watering. As their season of growth and time of flowering are concentrated into a few months, they should never be allowed to suffer either from lack of water or want of food. Many cultivators make a hollow cup round the stem so as to retain the water. Even after they are fully established water is often needed, and may be applied in quantity at least three times a week. Should the plants be at all weak, or the ground poor, liquid manure should be substituted for water in every alternate watering. Guano at the rate of two ounces to the gallon forms one of the most useful stimulants for Dahlias during the growing season. Some prefer solid dressings and apply the clean water over them so as to carry down the more easily soluble and consequently most valuable properties of the solid dressings to the roots; soot dressings are very useful applied in a similar manner. In dry weather mulchings of half-rotten dung, cocoa-fibre refuse, short grass or other litter are very useful in conserving the moisture of the soil. The roots multiply rapidly and run fast and far under such conditions. Overhead waterings are also very useful to Dahlias in dry weather; they remove dust, and cool and refresh the plants. Of course overhead waterings will not be used on flowers after they have begun to exhibit colour. Such fostering treatment will cause so rapid a growth as to necessitate a good deal of careful pruning and training. The former however, unless in the growing of show flowers, consists in the removal of all weak and worthless shoots, and the latter in so training those left as to insure a symmetrical growth without overcrowding. All malformed flowers should be removed as soon as they show, as well as any excess of small or misplaced buds. The taller Dahlias should not be stimulated so much as the shorter growing ones. A very useful means of dwarfing the taller growing varieties without injury consists in beheading them partially after they have made considerable growth, and thus suppressing the main shoots and developing the laterals. This brings the abnormally tall varieties down to the average level, and is often a useful expedient in symmetrical arrangements.

GROWING DAHLIAS IN POTS.

This method of growing Dahlias is, we believe, but very seldom attempted in this country, and at first sight to the uninitiated it would certainly appear a very unlikely subject to cultivate successfully in this manner; on the contrary, however, we have proved from experience that under careful treatment they may not only be induced to grow freely but also flower profusely, more so in fact than plants growing in the open ground. The following interesting remarks on this subject recently appeared in one of our English contemporaries:—

"We are possibly near the return of Dahlias into popular favour. True, they have little or no scent, and it became the proper thing to call them coarse. But things are mostly coarse or fine by comparison. Dahlias may be coarse contrasted with the finest Quilled Asters, but place them near the Sunflowers and they are fine. Much also depends on the stand point. Carried in the hand or brought near the eye, even bouquet Dahlias may be characterised as more or less coarse; but place them rather far off, marshal them into a boundary line, back them up against a high wall, and the coarseness merges into showy grandeur. In size, form, and colour the flowers of the Dahlia are without a rival. What towering masses of petals piled one upon the other till the forms are built up into three-quarter spheres, perfect models of symmetry and fit, displaying almost endless modifications of form! And then as to colour—in what family of flowers shall we find such spotless whites, soft yellows, brilliant scarlets, bright pinks, rich purples, and glowing golden-orange flowers as among the Dahlias? And what matchless meltings of one colour into another, the petals being tipped and painted with contrasting or harmonising shades innumerable, so that in some flowers it is almost impossible to describe the colours more correctly than to say that in them many beautiful shades mingle and melt into each other. The best-sized pots for Dahlias are the 10-in. or 12-in. These sizes will grow the finest and strongest varieties to great perfection. If not already divided, some of the finer roots may need reduction, otherwise the roots may become almost too large for the pots. The tops, too, are better thinned to from one to three or four stems. Most of the best growers reach their highest results with one-stemmed plants, and such plants are most artistic for pots, whether grown up with standards, a form well adapted, though seldom used for Dahlias either in or out of pots, or dwarf or tall bushes. When Dahlias in pots are used for making screens, the side stems may be left. The Dahlia is a gross feeder and a vast grower, therefore it must have a rich soil. Smashed bones and the parings of horses' hoofs form capital drainage. The soil should consist of

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rich, mellow, fat loam, still further enriched with at least a third of well-rotted manure. In the open many have great faith in leaf-mould, but there is no room for it in pots; the root-run being so limited it must be at once rich and durable. To insure the preservation of the soil the surface of the pots should be well mulched over with, say, 2 in. of manure. Through this all water must pass on its way to the roots, and of course it gets enriched on its passage. After the plants are in full growth, and especially as soon as they begin to show flower, nothing but manure water should be given them, and if the drainage be ample—about an inch and a half—it is difficult to give them too much. As a preventive to thrip, and an encourager of a cleanly growth, overhead sprinklings twice a day are also of the greatest importance. As the flowers reach perfection this overhead sprinkling must be managed with caution; some of the more delicate colours get tarnished with wet, and the sun also burns some of the darker flowers if it shine upon them in a wet state. A moderately sheltered place is best for Dahlias. They are very brittle, and easily broken by the wind, and should, therefore, not be fully exposed to it if it can be avoided. The plants should have their final shift, and be either securely staked at the same time, or fastened to a trellis, fence, or wall. If the former, caution must be exercised not to stake the root through in providing a holdfast for the head of the plant.

As the plants grow they need to be carefully disbudded, pruned, and trained. To have fine flowers many of the buds should be thinned out. More than one-half of the lateral shoots should also be removed to concentrate more force into those that remain, and to give greater size and substance to the flowers. The greatest enemy of the Dahlia is the slug in a young state and earwigs in the flowers. The latter seem literally to feast on Dahlia blooms, and often provoke gardeners beyond all endurance. For slugs a sharp eye and a few nocturnal visits to the plants, and traps of Cabbage leaves or cold Potatoes are the surest remedies. The earwigs are often woolled off by tufts of cotton wool being placed around the flower-stems Traps made of bits of Reed thrust among the leaves and stems of the Dahlias also prove too much for the curiosity of the earwigs. They creep in to explore or rest, and can be blown out into a hot bath in the morning. By perseverance in these simple methods Dahlia pests are soon got rid of. To develop or conserve the bloom of some of the finer sorts shade is needful from 10 a. m. to 4 p. m Circular boards, covered with rims of pasteboard about 4 in. deep, form the best shade for choice flowers. But such contrivances belong rather to the mystery of exhibiting than to the simple growth of Dahlias in pots for ornamenting gardens. It is, however, quite possible to grow show Dahlias in pots, and hence the hints about shading may be useful."

GARDEN WALKS.

The comfort and convenience derived from good garden walks can scarcely be over-estimated, as they enable the pedestrian to enjoy a stroll under conditions of weather that would render it anything but a pleasure to make use of them were they not sound and well made. Not only is this the case, but operations are greatly facilitated, as they admit of barrows or other traffic going on at any time instead of having to wait—a very important matter, inasmuch as a few days' delay at a particular time often leads on to another of still greater duration, and throws work sadly behind. This, no doubt, has been the experience of many connected with gardening; and as nothing detracts so much from the general keep and finish of any place as bad walks, independent of the great inconvenience they cause, every effort should be made to improve them. Unless the foundations are firm and solid, slight dressings of gravel, however good and adhesive it may be, is of little avail, for, although it may bind hard and remain so during a dry time, a few days' rain converts it into a perfect quag, that is not at all improved by passing a roller over it. It is better, therefore, with any that have been improperly made to wholly re-form them, which can the most readily be done by beginning at one end and taking out sufficient of the under part to admit of hard broken bricks, slag from furnaces, coarse stones, or anything of that kind being placed on to the depth of from three to six inches, according to the amount of hard wear they are expected to have, or the weight that is likely to pass over them. The great mistake many make when using this rough material is in not filling up the interstices between, thinking that by leaving the bottom loose and hollow they thereby secure free drainage, and lay the walks dry. This is a most erroneous notion, and is a frequent cause of rottenness, as the gravel shifts with the traffic and thus becomes broken, whereas, had it a firm bed to rest on, traffic would improve and consolidate it rather than otherwise. Instead of water passing through, as is the case when the basis is formed in the way noticed above, the top should be made as impervious as possible, that what rain falls may be conducted quickly away and carried off through gratings and drains made for the purpose. Without these no walk, except on a hill side, can remain in good order for any length of time; and therefore in laying out any fresh ones or re-making such as are already in existence, attention should be given to this first; and to save labour and pipes or tiles, the best way is to lay a main drain down the centre, with branches from the sides at about 20 ft. apart leading to it. Each of these should be connected with a small brick cesspool, made somewhat deeper than the drain, so as to catch any sediment that may wash in through the gratings; the neatest and most suitable of which are those cast so as to fit in an iron frame, from which they can be lifted and replaced when necessary for the purpose of cleaning out the cesspool. If these gratings are got about 6 in. long by 4 in. wide, they are not at all conspicuous, and are far preferable to any other on that account as well as on the score of cost, as there is no expense in making frames for them. Where there is a difficulty in getting an outlet for drains, dead wells may be formed at intervals to send the water in; but in all cases where these are resorted to, care should be taken to render them safe by backing up the sides and covering the tops with rough stone slabs or darning them over. These, however, are of little use unless the subsoil is of an open nature to let the water soak away quickly, and should only be used when there is no other easy means of getting rid of it.

As a material for binding the slag or whatever else is used for the foundation, there is nothing equal to fine chalk, as it not only sets hard and firm, but is likewise most objectionable and impenetrable to worms, which, unless this is used, are often very troublesome, as they not only disfigure the surface of the walks by the soil they exude, but they are the means of stocking the gravel with weeds, as the seeds of these can only germinate to any extent when so assisted. With a solid, compact mass for a bottom, such as the above-named mixture would form, and about three or four inches of gravel, consisting of two-thirds or so of fine stone, walks may be made that, with an occasional top-dressing, will last sound and enjoyable for any length of time, and such as will incur but slight labour in keeping them clean. In making choice of gravel, preference should be given to that which, when found in the pit, is in a hard compressed vein, as when in this state before being disturbed, it soon, with proper rolling and attention, gets into the same condition again. Any not so firmly imbedded, and therefore of a more sandy nature, may be greatly improved by mixing with it some finely-pulverised clay to give it adhesiveness, but this must not be overdone, or it will work out and be unpleasant to walk on. In sifting the gravel to separate the superabundance of fine material, two sorts should be made, the coarser of which to lay at the bottom and the small at the top, so as to finish off without any large stones cropping through in the way they otherwise would. A sieve of ½-in. gauge is the proper thing to use in preparing the material for the surface, as any that will pass a mesh of that size will bind firmer and be more serviceable and agreeable to walk on than if it were coarser. Shingly gravel, or that which has at some time or other been subjected to the action of water, should always be avoided as it is sure to be loose and constantly shifting under even slight traffic, on account of the smooth round nature of the pebbles it contains, besides which, they are always imbedded in sharp, sandy veins of earth that is totally unfitted for forming good sound walks. Stones that are more angular, and have sharp edges, get a firmer grip, and cannot well be displaced after having been once rolled in, as may readily be seen by any one at all acquainted with such matters

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Walks badly formed are a constant source of trouble and annoyance, ever requiring attention of some kind or other, particularly in the matter of weeding, as, from their loose surface, seeds effect a ready lodgment, and germinate and grow rapidly after every shower that falls. These weeds, in most cases, are difficult to deal with, and the more so where there are live edgings to the walks, as these prevent the use of salt, which is the best and most effectual means of ridding walks of their presence. Where there are Grass verges, it may be applied without doing the least harm, provided a favourable time be chosen for putting it on, which is after heavy rains with a rising barometer, as then there will be no risk of having it washed to the sides and damaging the Grass. The damp gravel and the night dews are sufficient to dissolve the salt slowly, in which way it is far more effectual than if done by a shower, or from watering, as then the strength is carried away from the crowns of the weeds, which are their most vital parts, and where they suffer immediately the sun shines hotly upon them. Not only is salt desirable for the purpose of cleansing walks from weeds, Moss, or other vegetable growth to which they are liable, but it has also a most beneficial effect in brightening and rendering them much more solid; and, if dressed annually about May, they will require nothing further, except the usual rolling and sweeping for the remainder of the season. For kitchen gardens and places of that kind, where real utility ought to be considered before ornament, dead edgings should always be used, and something that is hard, neat, and durable is greatly needed for this purpose to replace Box, which, although it looks well, is always a harbour and breeding place for slugs and other insects that prey on young tender crops. Walks might then be kept in first-rate order with a tenth part of the labour they now entail, as hand weeding is slow work, and to break them up, as is frequently done, causes them to be rough and unsatisfactory for some time afterwards. Asphalte, when well done, is very durable and serviceable, and does away with the weed nuisance; but when made with tar, the cheapest and best material for the purpose, the colour is objectionable, unless white spar, or something of that kind, can be used freely to take off its dead black, sombre appearance. In case where good binding gravel cannot be obtained at reasonable cost, tar paths form most excellent substitutes, but they should never be laid without a good solid foundation, or they will heave, from the action of frost, and break up into holes, which, if 'mended, always have a patchy, unsightly appearance. The bottom for these, as for gravel, may be made with fine chalk and stones, clinkers, or material of that kind most ready to hand, which, when put into its place, should be firmly rammed, to prevent any further subsidence. With such a foundation, walks may be made that will last a lifetime, if only subjected to fair ordinary wear; and, as they require no further expenditure of labour, or means to keep them clean when once formed, they are, in the end, the most economical, although they may cost a little more in the first place when laying them down. One important matter in connection with the formation of these asphalte walks is that they are well supported at the edges, otherwise they do not last sound long, as they break away at that particular part, and a kerb of some kind is therefore necessary, against which they may be finished. Strips of stone, about 2 in. thick, and rounded off slightly, are the neatest and most lasting kerbs that can be used, and from their grey tint of colour they form a good contrast to that of the tar. *Field.*

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Correspondence.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to, should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication, unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

FOLK-LORE OF THE HOLLY AND MISTLETOE.

One of the most popular plants at this season is the Holly, which, with its dark shiny leaves and bright red berries, is much in request for dressing up our churches and houses at Christmas. On this account one of its popular names is "Christmas." The term Holly is in all probability a corruption of holy, as this plant has been used from time immemorial as a charm against evil influences. Hence it was hung round or planted near houses as a protection against lightning. Its common use at Christmas is, says Mr. Napier in his "Folk-lore of the West of Scotland" (1819, p. 121), "apparently the survival of an ancient Roman custom occurring during the festival to Saturn, to which god the Holly was dedicated. While the Romans were holding their feasts, which occurred about the time of the winter solstice, they decked the outsides of their houses with Holly. At the same time the Christians were quietly celebrating the birth of Christ, and to avoid detection they outwardly followed the custom of their heathen neighbours and decked their houses with Holly. In this way the Holly came to be connected with holy also." It is curious that Shakespeare only once mentions the Holly, and then in "As You Like it" (Act ii., Sc. 7). Holly is used in some districts for divination Thus in Northumberland we hear of a he-Holly and a she-Holly, according as it is with or without prickles, the leaves of the she-Holly being alone deemed proper for divination. These must be plucked late on a Friday night by persons careful to preserve an unbroken silence from the time they go out to the next morning's dawn. The leaves must be collected in a three-cornered handkerchief, and on being brought home nine of them must be selected, tied with knots into the handkerchief, and placed beneath the pillow. Dreams worthy of all credit will attend this rite, and no small importance is consequently attached to them, as they are supposed, in the most unerring manner, to predict future events. The

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Holly on account of its prickly leaves, is much used for hedges. John Evelyn, in his Diary, alluding to this plant, asks, "Is there under heaven a more glorious and refreshing sight of the kind than such an impregnable hedge, glittering with its armed and varnished leaves, the taller standards at orderly distances blushing with their natural coral?" Evelyn had such a hedge at Say's Court, 400 feet long, 9 feet high, and 5 feet broad, which he planted at the suggestion of Peter the Great, who resided at his house while he worked in the Deptford Dockyard.

The Mistletoe from the earliest times has been an object of interest to naturalists on account of its curious growth, deriving its subsistence entirely from the branch to which it annexes itself. Thus Herrick describes it as—

"The mystic Mistletoe,
Which has no root and cannot grow
Or prosper but by that same tree
It clings about."

The Greeks and Romans both knew of this plant, and the Druids held it in the greatest veneration. The ceremony of gathering it at the commencement of the year was performed with every kind of pomp. The Druid priests, we are informed, went in solemn procession into the forests, where they raised a grass altar at the foot of the finest Oak on which the Mistletoe was found growing, and inscribed on the trunk of the tree the names of the most powerful among their deities. The Chief Druid, clad in white robes, then ascended the tree, bearing a consecrated golden pruning hook, with which he cropped the Mistletoe, and dropped it into a "white sagum," or pure white cloth of wool, held out beneath the tree by the remaining priests. Should any part of the plant accidently touch the ground, it was considered to be an omen of some dire misfortune about to visit the land. This ceremony was celebrated on the sixth day of the moon, and when it was concluded a sacrifice was made of two white bulls. Our practice of decorating houses at Christmas with Mistletoe is probably a remnant of this superstitious custom. Brand thinks that this plant was never put up in churches except by mistake or ignorance of the sextons, "it being a heathenish and profane plant, distinguished in pagan rites." It is certain, however, that during the feudal ages the Mistletoe was gathered with much solemnity on Christmas eve, and hung up in the great hall with loud shouts of rejoicing. In many country places the entire plant is still hung up in the kitchens of farm-houses, &c. Various superstitious notions are still attached to it, which too are not confined to our own country. Shakespeare alludes to it in his "Titus Andronicus" (Act ii., Sc. 3), and calls it the "baleful Mistletoe," and Gay styles it the "sacred Mistletoe." In Halstein the Mistletoe is the "maren-taken," or "branch of spectres," and is supposed to confer upon its possessor the power of seeing ghosts. No allusion to kissing under the Mistletoe is met with earlier than the middle of the seventeenth century.—(Rev. T. Thiselton Dyer, M.A., *in* "*Leisure Hour*.")

HORTICULTURAL IMPOSTERS.

The life-time experience of any man is not too short to be imposed upon by many of the hundreds of old varieties of fruits, flowers or vegetables that are sent out annually under new names. Any well-posted nurseryman can easily detect when a Bartlett Pear or a Baldwin Apple appears under a new name; or a florist, making a specialty of Roses, knows as, for example, when, some years ago, the old Solfaterre was sent out under the name of Augusta—claiming it to be hardy in every State of the Union, and sold as a great bargain at $5.00 a piece—that the vendors thereof were either swindlers or ignorant of the business they had embarked in; or when the confiding market gardener is induced to buy a new and superior Cabbage or Tomato seed, at $5.00 an ounce, and finds them identical with varieties that he can buy at half that price per pound, he has good reason to come to the conclusion that the man from whom he purchased was either a swindler, or else unfitted, from his ignorance, to engage in the business of a seedsman.

But, unfortunately, from the varied nature of these impostures, it is exceedingly difficult to mete out justice to those who, knowingly or otherwise, place such swindles on the horticultural community. For the man who grows fruit trees is as likely to know as little about Roses as the man who grows Roses is to know about fruit trees, and either is less likely to be posted on the merits of vegetables. So, then, if the partly experienced horticulturist may be imposed upon in such a way, how safe is the field when the swindler tries his tricks on the general public. The sharp man of the city falls as quickly into the trap of the horticultural swindler as the veriest rustic, because his city experience of impostures in other matters helps him nothing in this. He may not be much troubled when he sees a bootblack fall off the dock into the river, particularly if his companion plays off the heroic *role*, and plunges in after him to the rescue; he understands it all, for both can swim like ducks, and there was no more danger for the first than for the second, and none for either. A well-stuffed pocket book snatched from under his feet is an incident that does not in the least arouse his cupidity, for he has long been conversant with the trick of the pocket-book dropper. The mock auctioneer may scream himself hoarse, offering gold watches at $5.00 apiece and it hardly elicits a smile of derision. The tears of the benighted orphan in search of his uncle does not bring a dime from his pocket, for he understands it all, together with a score more of the tricks of the great city. But in the spring-time when his garden instincts begin to bud, and he sees in some window in Broadway flaming representations of fruits and flowers, he falls into the trap and is ready for the spoiler.

Some years ago I had occasion to act as an amateur detective in one of these horticultural swindling shops, the owners of which are now known in New York as the "Blue Rose Men." When I arrived, there were at least a dozen ladies and gentlemen engaged in buying seeds, bulbs, and plants, the flowers and fruits of which were represented by the pictures on the walls: for example, Asparagus was shown as having shoots as thick as a broom-handle, the seeds of which were selling rapidly at one cent a piece, warranted to produce a crop in three months from time of sowing; an old lady had just become the possessor of $5.00 worth, and seemed delighted with her bargain. One of the most attractive pictures on the wall was an immense coloured engraving, shewing a tree on which Strawberries were growing, and as big as Oranges. My gaze was attracted to a handsome plate of Blue Moss Roses, and I modestly asked the price of the plants. The polite Frenchman (who was doing the principal selling for the concern) whisked out from beneath the table there plants, representing them to be Moss Roses (which, by the way, were all alike, and were all our common Prairie Rose), and said, "This one he bloom only once; I tell you the truth, so I sell him for two dollar. This one, he be the Remontant, he bloom twice—just twice—I sell him for three dollar; but this one, he be the everblooming, perpetual Blue Moss Rose, he bloom all the time, he cheap at $5.00." I quietly remarked, if it bloomed all the time, why was it not blooming now? He looked at me pityingly, and said, "My dear sir, you expect too much; these Moss Rose just come over in the ship from Paris. You take him home and plant him, and he bloom right away, and he keep on blooming." I did not take him home, but I took the story something in the shape in which it is now told, and had it published, and in less than a week the "Blue Rose Men" had pulled up stakes, but, no doubt, to pitch their camp somewhere else, and set their traps for fresh victims.

The swindlers in horticulture have their comical side. The other year, in passing St. Paul's Church (Broadway), New York, an old negro had squatted on the pavement with a great bundle of plants carefully mossed up, lying alongside of him. On inquiring what they were, he said they were Rose bushes—Rose bushes having all the attributes wanted in a Rose, fragrance, hardiness, and everblooming, and the price but 50 cents a piece. He had got them, he said, from the boss, and was selling them on commission. The poor darkey was only an innocent agent. He no doubt believed he was selling Rose bushes, but the boss, whoever he might be, undoubtedly knew better, for the plants were not Roses at all, but the common Cat Brier (Smilax sarsaparilla) one of the worst pests of our hedgerows, but the plant of which is near enough in appearance to a Rose to deceive the ordinary city merchant.

The bulb peddlers, a class of itinerant swindlers, deserve brief attention. They have always some wonderful novelty in bulbs; and their mode of operating to the uninitiated, has a semblance of fairness, as they are liberal fellows, and frankly offer to take one-half cash on delivery, and if the goods do not come up to the representation the other half need not be paid. For example, when the Gold-banded Japan Lily was first introduced, bulbs the

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size of Hickory nuts sold at 250 dols. per 100. About that time one of these worthies came along with samples of a Lily of fine size and appearance, with which, he said, he had just arrived from Japan. There was no doubt of its genuineness, for he had seen it in flower. He had a large stock, and would sell at 100 dols. per 100, but he was willing to take half that amount down, and the other half when it flowered and had proved correct. It did not prove correct, and he never called. The bulb he sold was the common white Lily (Lilium candidum) which is sold everywhere at 5 dols. and 6 dols. per 100. These same scamps flood the rural districts every year with blue Gladioli, scarlet Tuberoses, and other absurdities in bulbs and seeds usually on the same terms, of one half cash down, the other half when the *rara avis* has feathered out. It is needless to say that they never try it twice on the same victim, but avail themselves of our broad continent to seek out new fields for their operations.

One of the most successful swindlers of this type was Comanche George, whose fame became national. George made his advent in New York in 1876. He was, he said, a Texas scout, and for years his rifle, revolver, and bowie-knife had been the terror of the men, but one day in his rambles on the lone Texas prairies his eye was arrested by a flower, whose wonderful colouring eclipsed the rainbow, and whose delicate perfume was wafted over the Brazos for leagues; in short, never before had eye of mortal rested on such a flower. The man of war was subdued.. He betook himself to the peaceful task of gathering seed, and turned his steps to the haunts of civilised man to distribute it. We first heard of him in Washington, where he wished to place it in the hands of the Government, and accordingly offerred it to Mr. William Smith, superintendent of the Botanic Gardens there, but the Government, so Smith said, was not just then in a position to buy, and with his advice George trimmed his sails for New York and a market. His success in Baltimore and Philadelphia was so great (where he started the sale of the seeds at two cents a piece) that it induced him, when he struck New York, to advance the price to five cents a seed. He put up at one of the best hotels, and claimed that for a month his sales of the seed of the Cookatello—the beautiful Texas flower—reached 50 dols. a day. But his success threw him off his balance; he took to firewater, and in an unguarded moment fell into the hands of a newspaper man, who extracted from him all the facts connected with the enterprise. George never was a scout, had never been in Texas, but he had been a good customer to the various seedsmen of the different cities, where his purchases of Okra or Gumbo seed, at about 50 cents a pound, had made nearly a dearth of the article. His victims (whose names he gave by the score, and which were duly chronicled in the newspaper article referred to), were from all classes: the enterprising florist, who secretly went into it in a wholesale way, with a view to outwit his less fortunate fellows; the grandee of Fifth Avenue, who anticipated a blaze of beauty on his lawn—the hotel man whose window boxes were to perfume the air—all had fallen easy victims to the wiles of Comanche George. George disappeared from New York, though there is but little doubt that his business had been too successful for him to abandon it. A newspaper paragraph, cut from a paper the other day, which reads as follows, looks as if it might be the Texas scout in a somewhat different *role*:—

"The prepossessing appearance, gentlemanly demeanour, and foreign accent of the man who called himself Carlo Corella, 'botanist to the Court of Brazil, convinced a number of wealthy San Francisco ladies that he was truthful. He said to each that the failure of a remittance compelled him to sell some rare bulbs of Brazilian Lilies which he had intended to present to Mrs. R. B. Hayes. 'The flower,' says the paragraph in question, 'was to be a great scarlet bell, with ecru ruchings on the petals, a solferino frill around the pistil, and a whole bottle of perfumery in each stamen.' He sold about fifty almost worthless bulbs at 4 dols. each."

The nurserymen present are no doubt better posted in the swindles practised in their particular department than I am; but operators engage in different lines in different parts of the country; for example, we have never yet seen in the Eastern States anyone trying to sell an Apple tree bearing blue Apples as big as Melons, as we were told at our meeting at Cleveland last year had been successfully done in Ohio and Illinois. Still we have men of fair ability in the nursery swindling line, one of whom last winter succeeded in disposing of hundreds of winter-bearing Grapes by carrying with him a few good bunches of the white Malaga of the shops.

One great detriment, not only to the florist, but to the purchaser, is begotten of these swindles in horticulture. The purchaser of flowers in our markets must have his plants in bloom because he has been at times so swindled that he must now see what he buys. In New York the amateur rarely buys from the grower, but from the agent or middleman who sells in the market stands or street corners. These, whether men or women, are generally entirely ignorant of the nature of plants, and most of them have no responsibility, and they rarely fail to make their wares accord to the wants of the purchaser; nearly every plant *is* hardy, ever-blooming and has all the qualities desired by the buyer.

Now and then these swindles become a serious matter to the victim. Some years ago, a typical Englishman, who had been a greengrocer in Covent Garden Market, found his way to New York. He at once discovered an almost entire absence of Cauliflowers in our markets, and what few there were sold at prices four times those of London. He soon made up his mind to make his fortune, and at the same time show the Yankees something they did not know. He duly selected and prepared the ground for an acre, and one day in May he sallied into the market to procure his Cauliflower plants. This he found no difficulty in doing, for at Dutch Peggy's—in those days the headquarters for all kinds of herbs, plants, and seeds—they were to be seen by the waggon load. 10,000 were procured, the quantity for his acre, and, duly planted, they began to grow apace. He had planted the 1st of May. If it had been in England, his Cauliflower heads would have been ready about the 1st of July; but something was evidently wrong in the Yankee climate. His Cauliflowers grew through June, through July into August, only to develop into fine specimens of Drumhead Cabbage, then of hardly the value he had paid for them as Cauliflower plants. He got out of the business thoroughly disgusted, and in telling his sorrowful tale to me a year afterwards he related that when he went to expostulate with old Peggy about having blasted his prospects, before he could get a word said she recognised him as a customer, and demanded to know if he did not again want some more *early* Cauliflower plants.

I have said old Peggy was also a vendor of seeds. It is now something over thirty years ago that a young florist presented himself before her and purchased an ounce of Mignonette. Ever alive to business, Peggy asked him if he had tried the new red Mignonette. He protested there was no such thing, but Peggy's candid manner persuaded him, and 50 cents were invested. The seed looked familiar, and when it sprouted it looked more familiar; when it bloomed it was far too familiar, for it was Red Clover; Peggy has long since been gathered to her fathers, and I have entirely forgiven her for selling me the red Mignonette.

Perhaps there is no swindling that is more extensively practised, and which so cruelly injures the operators of the soil, as that of adulteration in fertilisers. The great mass of our farmers and gardeners are poor men, who can ill afford even to pay for the pure fertilisers necessary to grow their crops, and to pay money and high freights on adulterations worse than useless is hard indeed. The ignorance of those dealing in such wares does much to spread the evil. A fellow came into my office last summer with samples of a fertiliser, nicely put up in cans, which he claimed could be sold in immense quantities by the seedsmen, as it had not only the wonderful properties of invigorating and stimulating all planted crops, but that it at the same time would kill all noxious weeds. I need not say that he has waked up the wrong passenger, and that he made a rapid movement towards the door. Yet, notwithstanding the absurdity of such a claim, the scamp was enabled to prowl around the vicinity of New York for weeks, and undoubtedly sold to hundreds. If he had said he had a cannon from which, when grape-shot was fired into a crowd, it killed only enemies—never friends—the one claim would have been as reasonable as the other.—*American Gardeners' Monthly.*

MANURES.

The following, for which we are indebted to our correspondent, Mr. De Mar, is a paper which was read at a meeting of the Massachusetts Horticultural,

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Society, and will be of interest to many of our readers resident near the great fishing stations and fish markets of this country.

The Hon. James J. H. Gregory was introduced to the meeting, and read a paper on "Nitrogen." After an introduction, showing the very small quantity of mineral matter in plants—a cord of wood, that might require two yoke of oxen to draw it and would be of the bulk of 100 bushels, yielding but a bushel of ashes, which the driver might carry on his shoulder—and the sources of this matter, he passed to the consideration of nitrogen, which makes up about four-fifths of the air mass that surounds the earth for a depth of about 50 miles, the other fifth being oxygen. This gives unnumbered thousands of tons of nitrogen, right at hand, but never available, for human knowledge has not yet discovered a way by which nitrogen can be economically got from it for plant food. We have to depend for our supply wholly on what plants and animals have incorporated into their structure, using their waste in the form of manure, dead remains, either from land or sea, for our supply. The ammoniated liquor from the gasworks is but the waste produced from the remains of ancient forests which we burn as coal.

When nitrogen is combined with hydrogen in the proportion of three parts of hydrogen to fourteen parts of nitrogen, we have ammonia, one of the most common forms, in which forms the waste of both animals and plants, nitrogen is fed to our crops.

The other most important source of nitrogen is nitric acid. This is a combination of nitrogen with oxygen; and nitrates, of which we see frequent mention in all works on manures, are a combination of nitric acid with soda, potash, and other materials called bases. It is well to fix in the mind that, in changing nitrogen to ammonia in any manure analysis, we must add about one-fifth to the quantity given. It appears to be the settled conviction among men of science, as the result of many experiments, that plants cannot take up pure nitrogen directly from the air. The theory is that they are able, in a greater or less degree, to get their supply through the water that carries it in some form in solution into the soil, and also from the air indirectly by the soil first separating it from the air that permeates it. Still another source of natural supply for plant growth is nitrogen in a latent condition, that has accumulated in the soil, set free by the action of such substances as lime and plaster. There is a general belief among agriculturists that plants have ways of collecting still but little known, while some extremists have gone so far as to declare that there is no necessity of feeding nitrogen to our crops, for they can of themselves collect from natural sources all they require. There is a growing belief that their power to supply their wants from natural sources is greater than has hitherto been credited to them. It is found also that different kinds of plants have different capacities for taking up nitrogen. Clover is an example, for though nitrogen enters largely into its composition, it has such a capacity to help itself to the good things which surround it, that it needs but very little artificial help from the manure pile, while wheat, though it needs but little nitrogen, is so dainty a feeder that it insists on a large artificial supply from which it may pick out that little.

In regard to the sources from which the practical gardener can obtain nitrogen, Mr. Gregory first considered hen manure which has by some been compared in value to guano, but he regarded this as over-estimated. He laid down a grand principle, that no more nitrogen, phosphoric acid, or potash can be obtained from the manure of any animal than is contained in its food. An ordinary hen will eat about 2 bushels of maize a year, and the larger breeds about one-half more. From this they must take the material for about 125 eggs annually, a change of feathers, keep up the animal heat, and make up the growth of the body, besides performing the various functions on which life depends. Now, subtracting what is required for these purposes, the waste element in our 2 bushels of maize shrinks to very small proportions. We must also take into account the fact that the dropping which we save are confined almost wholly to those made during half of the twenty-four hours. By analysis 2 bushels of maize contain, in nitrogen, potash and phosphates, 46 cents in value. From this standpoint it will be seen that the droppings of a hen for a year cannot contain nearly the value sometimes claimed for them. For many years the essayist collected hen manure at a cost of 1 dol. per barrel, but afterwards reduced the price to 75 cents, and thought it at the latter price a cheap manure until he tested it side by side with an equal value of guano. Moreover, it is a sticky mass difficult to handle, and it is worth any one's while to experiment, if it were only to realise the advantage in the handling of any commercial fertiliser over hen manure even in its finest state. It is generally composted with muck or dryish soil—three parts of muck to one of manure—and the compost should be made as fine as possible. A rake is the best tool to do this with if it is sticky and it should be turned over in three or four days, and a six-tined fork is a good implement for this purpose.

Sulphate of ammonia, a by-product where coal is used for the manufacture of gas, is one of the principal sources of nitrogen. It looks like rather coarse salt, and is often sold in huge casks weighing 1000 lb. or 1500 lb. It is readily soluble in water, but does not waste in the air. Nitrate of potash (saltpetre) is usually too costly a source of nitrogen to make it available. Nitrate of soda is a remarkably stimulating fertiliser, but if there is much rain it will waste before plants can take it up. In dry seasons, however, it is better and cheaper than sulphate of ammonia, as the latter needs a degree of moisture to make plant food; yet, on the whole, the latter is considered the better investment, for, first, it is not likely to be lost in the atmosphere; second, it is not too soluble; and third, it has the power of clinging to the ingredients of the soil. Clay will hold it persistently, and even pure sand, when washed with water, will retain a large portion of it. Its ammonia is easily changed into nitric acid by ingredients in the soil. Nitrate of soda is very liable to be adulterated with white sand or broken quarts, and with common salt or the cheap potash salts. The purchaser should see that it dissolves entirely in water and does not taste distinctly of salt. Castor oil pomace affords a supply of nitrogen, but it must be kept from animal, as it is poisonous, and in spreading it care must be taken to go with the wind, as it is very disagreeable to the eyes or mouth. Cotton seed meal is better fed to stock, and the manure used, which will be nearly as rich as the meal before feeding. Occasionally spoiled meal can be found in the market and this as good for manure as the best, and is a very cheap source of nitrogen and phosphoric acid. Wood and horn shavings and leather are very rich in nitrogen, but they are not readily available, and therefore they have a low value as market articles. The last is excellent for mulching, and in time will decay and fertilise the ground, but if worked into tillage land it becomes a nuisance.

The waste of the fisheries is one of the principal sources from which manufacturers obtain the ammonia in their fertilisers. The largest portion is from the fish called menhaden, hardheads, moss bunkers or fat backs. They are caught in immense quantities in nets, and boiled to secure the oil, in which they are rich. After pressing, the pomace or chum is packed in barrels or dried ground. When a surplus of fish is caught they are sold to farmers, who put them directly on the grass land where the effect is very stimulating for a few years, but the final result is that the soil becomes hard and the fish have less and less effect, and finally the crop is almost nothing. The fish are deficient in potash, and the result is what always comes from continuous manuring with any substance that is deficient in any one of the three essentials of plant food. The land can be restored by using potash. Other fish wastes are found in the form of spoiled fish, and the heads, sound bones, and entrails of fish which accumulate at fishing ports. So immense was the waste of heads, bones, &c., of fish at Isles of shoals that the harbours had to be cleared twice by dredging them out. The essayist left a standing offer with a fisherman, a few years ago, of 25 cents per 100 lb. for all surplus pollock; the result was that 20,000lb of fine large fish, weighing from 8 lb. to 15 lb. each, just out of the water, was hauled to his manure heaps. All these substances are, however, very disagreeable and difficult to handle, requiring a vast quantity of soil to compost them. Where bay fishing is carried on on a large scale, liver or blubber chum can sometimes be found, and furnishes a very cheap source of nitrogen. It should be cut with sharp sand before composting, to make it fairly fine. Halibut chum is the refuse from the heads of halibut, which are cooked under high pressure to extract the oil, and the bones are left in such a state that they can easily be crumbled. It is especially rich in phosphoric acid. The sink, bones, and fins of salted fish, stripped and sold free of bone, are another form of fish waste, and the waste of herring mackerel at the fishings stations is sometimes made up into chum. Dogfish, a small species, of shark, are caught in immense quantities, and are very rich as manure,

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their muscles being very firm. The shells and other refuse of lobsters at canning factories are ground up and sold as plant food, and are especially rich in nitrogen.

All fish waste must be composted with a large quantity of soil, or the crops will be burned; and the compost, owing to its great richness, should be spread broadcast rather than used in the hill. Fish chum may be used broadcast or composted with poor manure to enrich it, or with soil, muck, sawdust. It is surprising how penetrating is the ammonia from fish compost, and, therefore, in making a heap, the bottom layer of soil should be a foot or more in thickness. Cases have been seen when the fish was mixed liberally where the soil was full of ammonia for several feet below the surface. The layer of fish should be thick enough to just hide the soil, and the next layer of soil about 3 inches, and so on, scattering raw ground plaster over each layer of fish before covering with soil, at the rate of 50 lb. plaster to 300 lb. of fish. The heap should be on level ground, with a little embankment around to catch the liquid that sometimes runs from it when the fish begin to decompose, or may be washed out by heavy rains, and it will be handy to fill up the holes that are apt to show on top as decomposition progresses, letting out bad odours unless closed. Fish containing much oil are better composted with stable manure, and plaster should be scattered as before directed. If decomposition is slow to start, unleached ashes or lime may be mixed with the mass; but be sure to cover the heap with several inches of soil.—*Gardeners' Chronicle.*

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Editorial Article.

FLOWERS.

"Flowers," Bacon says, "are the thoughts of angels." Could the simile be more apt ? Of music it has been said that "he who is not moved with concord of sweet sounds, is fit for treasons, stratagems and spoils." The same sentiments might be expressed in regard to the person who has no love for flowers, and that, too, with much more truth. It has doubtless fallen to the lot of more than one of our readers, some time during life, to have met one person who did not care or like to hear music,—whose soul was above being moved with "concord of sweet sounds ;" but we defy any of our readers to cite a single instance of coming in contact with any person who did not love flowers, or, at least, care for and admire them. True they may not have been, as one may term it, an universal admirer of flowers ; but still there is no person who has not his or her favorite flower ; a flower which to them is emblematic of some peculiar quality they most admire ; and we can safely aver that the groundwork of our strong affection and love for flowers is based upon this very apparent semblance. It can be nothing but this floral representative of qualities, otherwise abstract that has created such universal admiration and love for them.

There is no action, thought or sentiment peculiar to human nature that has not its representative character in our floral universe. In what a high degree can our passions be represented ! The lover succumbing to "all nature's sweet song" offers, upon the altar of love, flowers ; and presents to the mistress of his affection flowers selected as fit attributes of his love, thus employing flowers to represent the divine principle in man. The poet, in stanzas, enthusiastically chants the peculiar qualities of some favorite flower ; perchance it may be a Rose, a Camellia, a Forget-me-not, a Violet, or that flower of flowers, the Passion Flower, the several parts of which have been compared to the instruments of our Saviour's Passion. Every nation has its representative flowers, and if our space permitted we could cite each seriatim.

Flowers play an important part in our affairs of life ; and not only are they used as offerings to the living, but also as tributes to the dead. The flower most used for the dead is the tuberose, the aroma of which seems to be impregnated with pure angelic thoughts ; to such an extent is the tuberose now used in tributes to the dead, that to some its very perfume is unbearable, simply for this reason. But, on the other hand, to many its aromatic odour is laden with the fragrance of affection.

With the English, both at home and abroad, the cultivation of flowers is every year increasing ; more thought, care, and attention is bestowed upon,our pets than at any former period in the world's history and yet, the same as with most objects for which we possess

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any strong affection or liking, they are frequently ruined by our ignorance of the treatment they should receive: some treat their flowers with an utter disregard for their good or their comfort. It is true in most cases it is more inadvertent than wanton; still it is none the less censurable. It requires but little observation to discover what is most beneficial to their growth and well-being. If one has a bird, he is apt to note any unnatural appearance or action that may occur, as exhibited in drooping plumage or in the cessation of its song, and resource is directly had to restore the bird to its normal condition. Now we can in most instances as readily and with as much truth discover what ails our plants, and should deal with and treat them accordingly; they exhibit in as high a degree their peculiar ailments as our birds. Then why not bestow that minute attention upon them? Persons who rear plants should study them and their wants, no matter how little they watch their peculiar exhibitions of health or sickness, the good accruing therefrom will in the end be discernible in the appearance and health of their plants. As it is requisite that we feed our birds at stated times, so it is essential for the well-being of our plants that they be watered and attended to regularly. There is no very great line of difference between plants and birds, both move and have their being in somewhat the same degree. Though to some unversed in the peculiar mechanism of plants there may appear nothing but what is caused by some freak of nature, yet if they will take the time and trouble to study the matter ever so little, they will discover that their germination, growth, &c., is in accordance with law and order; and as the nature of a child depends to a great extent upon the care, attention and training it receives, so that of a plant is as much dependent upon its training and cultivation to allow of its perfecting its growth in an orderly manner. The *Pharmaceutical Journal* in a recent article says, that "there is much to reconcile students to the study of Botany. It is the study of some of the most beautiful objects in nature, which, although in the ordinary sense mute, possess an eloquence of their own, and never fail to appeal to the hearts of those who are willing to hold converse with them. They are organised beings like ourselves, and of all created beings they are perhaps those which offer the greatest facilities for deep searching investigation into the mysterious development of special organisms, springing either from an ingrafted type or from a minute spark of vitality which may have lain dormant for years in an apparently inactive seed. There are some hundreds of thousands of forms of vegetation proceeding from such obscure sources, each having distinct and definite characters of its own which it is capable of further propagating and thus maintaning a life everlasting. The root, the stem, the branches, the leaves, the flowers, the fruits, the seed, consider the arrangement of all these parts, how extremely elaborate and sometimes fantastic they are. Such arrangements are apparently infinite, but they are all subject to a law of nature, namely that of symmetry, which is one of the elements of beauty. Among the inducements to pursue the examination and study of the elementary structure and arrangements of parts in the vegetable kingdom is this, that we have tangible objects to deal with here which can be brought within the cognizance of the senses. The knowledge we thus acquire is of a definite and definable nature. There is nothing speculative about it. It partakes not of the abstract, but of the concrete character."

If so much can be said in favor of the study of botany, how many more attractive qualities may be claimed on behalf of horticulture, for with the former we deal mainly with dried subjects or fully developed specimens only, but with the latter we are able to see all the various phases of plant life from infancy to maturity.

Editorial Notes.

"Loco" Weed.—The *Journal of Forestry* has an article on a weed growing in Texas and New Mexico which causes symptoms of intoxication in horses which graze upon it. One company is said to have lost 400 animals through its effects. The most common "Loco" plant is said to be *Astragalus mollissimus*; other leguminous plants have a like evil reputation.

Tea in the Caucasus.—One of our Russian correspondents informs us that under the auspices of a society, the cultivation of Tea in the Caucasus is likely to be successful. Experience has shewn that, the shrub thrives at Souchoum-kāle, Batúm and various other places near the Eastern shores of the Black Sea. —*Gardeners' Chronicle.*

The Annual Show of Flowers, Fruits and Vegetables, under the patronage of their Excellencies the Viceroy and the Countess of Dufferin and H. H. The Lieutenant-Governor of Bengal and Lady Rivers Thompson, will be held in the Gardens of the Agri-Horticultural Society of India on Wednesday, the 10th February. A schedule of the Prizes to be awarded will be found in another column.

Women's Work.—A French woman writes to the *Vigne Americaine* to say that, although unlike some of her sex, she does not attend a school of grafting, yet she manages to graft 300 vines a day, in March and April, besides attending to her children and to her household duties. Her husband, less embarrassed by other work, grafts twice the number. Numbers of women and girls are now employed at the proper season in grafting the better kinds of French Vines on to American Stocks which are less injured by the attacks of the Phylloxera.

Fruit Culture in Oregon.—Vice-Consul Laidlaw states that much more attention is being paid to orchards in Oregon, as through the opening of new lines of railroad a ready market has been found for green fruits in Montana, Dakota, Minnesota, and other states. The crop was a very heavy one, Apples, Pears, Cherries, Plums, Prunes, Currants, Raspberries, and Strawberries grow in great profusion and perfection, and the crop of all fruits was a very heavy one last year, and of superior quality. Peaches grow to great perfection in Eastern Oregon.

American Fibres.—The *American Eagle* says, that among other matters of special interest connected with the American Exhibition, London, 1886, may be mentioned that of American fibres. During the past ten years many valuable discoveries have been made of fibrous plants in America, suitable for the manufacture of rope, twine, paper, &c., and some of the results have been of the greatest value to the future commerce and manufactures of the United States. The importance to all the world of this question of fibres has led to the appointment of a special commissioner for the collection and exhibition of American fibres to the forthcoming American Exhibition, London.

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ANOTHER USE FOR GRAPES.—Grapes will be abundant this year in California, and a few Grape-growers who have the Mission variety will adopt the plan of fattening hogs on them, unless prices are good. Mr. Mertes says one of his neighbours, Mr. Gould, has tried the experiment thoroughly, and is perfectly satisfied with the results. Hogs will fatten as well on Grapes as on corn. They eat ravenously when first turned into the Vineyards, but soon become fat, and spend most of their time sleeping under the Vines, too fat to run about. They neither destroy the Vines nor waste the Grapes, but pick up all that drop on the ground, and the feed lasts much longer than one would suppose who has never tried the experiment. From the time Grapes are ripe until after frost the supply holds out unless the number of hogs is disproportionate to the size of the field. Two or three hogs can be kept several months on each acre.—*Rural New Yorker.*

DIFFICULTY OF BREATHING CAUSED BY PELARGONIUMS.—The *British Medical Journal* for November 28th contains a note on difficulty of breathing produced by *Pelargonium grossularioides*, by DR. G. BIDIE, Deputy Surgeon General, Madras. Dr. Bidie says that the odour which the plant gives out after rain &c., is agreeable to most people, but that in the case of a lady who came under his observation it immediately produced dyspnœa. As the plant was in flower at the time, it was thought that the pollen grains caused the trouble, as in hay fever, but on experiment it was found to be due to the effluvia of the leaves. Whenever plants were brought near the lady she was affected by them, and when out driving or walking she would announce the presence of the enemy when the plant could not be seen by the eye, and whilst other people could not smell it until their attention was directed to it. This is, therefore, a new example of an "idiosyncrasy of olfaction."

THE JERUSALEM ARTICHOKE.—The Sunflower Artichoke is being extensively cultivated in Belgium, as by a new process of distillation some 8 per cent. of alcohol can be obtained from its tubers. More than 3,500 acres of poor, almost waste land around Antwerp will this year be cropped with the plant. The residue after distillation is nutritious. France is thus also in the way of cultivating large stretches of her poor, thin, chalky and schistose soils with this new crop. The cultivation of Jerusalem Artichoke is very much the same as that of the Potato. February or March is the time to plant; the earlier, the better will be the yield. Indeed if the soil be sufficiently friable, the planting may be made even in winter. Owing to the quantity of its foliage the Jerusalem Artichoke draws a great deal of its nourishment from the atmosphere. Artichokes are now being cultivated alike in Iowa and Arizona as a material for fattening pork. In field culture they are not hard to eradicate, and must be replanted at least once in two years. An Iowa farmer finds one or two acres sufficient for quite a large herd of hogs.—*Journal of Forestry.*

TO PRESERVE FLOWERS.—There are not many flowers suitable for preserving. Among the most beautiful of the garden, the acrolinium and the heart's-ease may be mentioned as well adapted for this purpose. The heart's-ease being cut while in full bloom, with a sufficiently long stalk, has to be carefully laid between folds of blotting-paper, and then pressed with a heavy weight, which must remain over it for from twelve to twenty-four hours. By this means nearly all the moisture is removed. The flowers are then taken out and ironed with a hot flat-iron, while still in the paper. This process removes the last traces of water, and they are then quite ready for use. The acroliniæ being naturally dry plants—the blossom appearing more of the texture of dried straw than a living flower—it is not necessary for them to undergo this operation of drying. In order, however, to obtain a variety of tints, many of them, and particularly those bearing white and yellow blossoms, are dyed. Grasses of various kinds are also thus dried and preserved. When a few plants have been prepared in this way, a pleasing and ornamental bouquet may be made of them, which, being placed under a suitable glass shade, constitutes a very attractive ornament for a drawing-room.

ORCHID EXPORTATION FROM BRAZIL.—We confess to a certain feeling of satisfaction at reading the following extract from a letter written by one of the collectors of the Compagnie Continentale: "The Municipal Council of the island of St. Catherine has imposed a tax of 500,000 reis (2,500 francs) on each individual leaving the island with plants, and an additional tax of 5 per cent. provincial dues; and all this because a collector last year boasted to have taken from the island more than 100,000 francs worth of Orchids, saying that the Brazilians were simpletons who did not know the value of their weeds as they call the Orchids. I foresee the time when, all the countries acting in the same way, Orchids will become very rare in Europe, and where it will not be easy in future to introduce them in large masses. It is alleged that certain districts formerly rich in Orchids, are no longer so now. The great fault does not, however, depend on an excessive quantity of Orchids sent to Europe, but on collectors, who, after having obtained the desired number, set the forests on fire and thus destroy the plants and prevent them being collected by others." If this be true, hanging is too good for such murderers.—*Gardeners' Chronicle.*

IN a recent article on the subject of New Roses, a writer describes the French as a very imaginative people, and deprecates this trait in their character, and certainly with good cause, for in introducing new plants we want nothing left to the imagination. There are, however, other fields in which this remarkable faculty may be displayed to advantage, and we have just been forcibly reminded of this fact by receiving from Messrs. Moore & Co., the well known drapers of this city, samples of their Summer Dress Fabrics for the ensuing season. These are almost exclusively of French manufacture, and certainly for variety and chasteness of design surpass anything we have hitherto seen. The assortment embraces materials and patterns to suit all tastes, from the admirer of the modest daisy to that of the æsthetic sunflower. Here is a legitimate field for the talent of our neighbours, and one in which they certainly excel. If we could only induce the French Raisers of *New Roses* to be content with showing us their novelties by introducing them in some elaborate design for Dress Fabrics, instead of filling our gardens with hosts of worthless varieties, it would be a distinct gain to horticulture,—that is, until they can give us something far superior to the introductions of the past two or three years.

NILGIRI FLORA.—The moist evergreen forests of the Nilgiris are grandest on the western slopes and between 3,000 and 4,000 feet elevation, where the trees often attain 200 and 250 feet in height. They are *all* evergreen, and the great variety of foliage and color render them exceedingly beautiful, some of the young leaves coming out pure white, others a bright crimson, others all possible tints of brown, yellow, red and green. These tracts are exceedingly moist from the first showers in March till the end of December, and during that season abound with leeches. The trees are often covered with *Epiphytic* orchids, ferns, mosses, balsams, and there is a glorious profusion of rattans, tree ferns, climbing ferns, and fine creepers. What may be said to be most characteristic of these forests is the genus *Strobilanthes* (Acanthaceæ), large shrubs which form the principal under-wood, and of which at least 30 species are found on these hills. Some of these flower every year, others only after a growth of six or seven years, when they die down, and renew themselves from seed. They have all showy flowers, and many are very beautiful. The two palms *Caryota urens* and *Arenga Wightii* are very conspicuous in these tracts; also several species of rattan (*Calamus*,) and two very fine reed-bamboos. Ferns are in great profusion, including several tree ferns, amongst which the *Alsophila crinita*,—not yet we believe introduced into hot-houses—is unmatched in any country. Very beautiful *Sonerilas* and *Balsams* are also in profusion. *Gattiferæ*, *Rubiaceæ* and *Euphorbiaceæ* are the orders most copiously represented. Above 4,000 feet these forests begin to decrease in size, and towards the plateau they gradually pass into what we term *sholas*. These moist forests never reach quite down to the plains any where round the Nilgiris, though they do so in parts of South Canara, Coorg and Travancore; they always

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give way at about one thousand feet from the base, to deciduous forest or tracts composed of nothing but reed-bamboos.—*S. of I. Observer.*

STIMULATING AGENTS IN GERMINATION.—Allusion has already been made to different means of hastening the germination of seed, such as breaking the shells, soaking in very hot water, or even boiling for a short time. There are some substances which appear to exercise a stimulating effect in the germination of seeds and the future growth of the seedlings. Camphor, a vegetable product itself, appears to possess this property in an extraordinary degree. Indeed, it has been averred that camphor has the power of revivifying seed, or at least of causing them to germinate when ordinary treatment failed. Benjamin Smith Barton was the first to point out its action upon plants at the end of the last century; and a few years ago a Mr. Vogel, of Munich, carried out a number of experiments with camphor on old seeds. Controlling experiments were conducted simultaneously, ordinary water being employed instead of camphor water. Seed of Cress three or four years old, treated with ordinary water, germinated very imperfectly and long after sowing, while that moistened with camphor water germinated quickly; that four years old in twenty-four hours, and that three years old in seven hours. Radish seed, which is usually regarded as useless after it is three or four years old, was tried seven years old, and it germinated in four days, or in a much shorter period than good fresh seed under ordinary favourable conditions. Seed of the Pea eight years old germinated in forty hours, and many other old seeds treated with camphor water exhibited equally rapid germination. Some that would not germinate at all under ordinary treatment, had their germinative force revived by camphor. Other seeds, Clover, for instance, appeared to derive no benefit from the solution of camphor; but where it acts its influence is not limited to germination, but is extended to the subsequent growth. Humboldt discovered that chlorine accelerates germination, and acts as a restorer where the vital force is almost exhausted or quite lost, so far as the usual method of treatment is concerned. This must be used in a highly diluted form; about two drops of an aqueous solution of chlorine in 2 oz. of water. Iodine and bromine are said to possess similar qualities. Acid and ammonia salts in very small quantities in the water have been found to hasten germination, but they have not the power of reviving seeds.—*The Garden.*

Original Articles.

THE ROSE.

ROSES FOR EXHIBITION—(*continued*).

SHOW BOXES.

The following is the standard measurement of Show Boxes generally adopted by the principal Rose Societies in England, for Exhibits in the various classes:—

	Length.	Breadth.	Height.
For 24 Roses	3 ft. 9 in.	1 foot 6 in.	Back of box 7 in. front 5.
„ 18 „	2 „ 9 „	„	„ „
„ 12 „	2 „ 0 „	„	„ „
„ 6 „	1 „ 3 „	„	„ „

Mr. W. Paul, on this subject, says in the *Rose Garden*: The boxes may be made of inch deal of the simplest construction and painted green. By the laws of some Societies framed for general convenience the lids must shift off at pleasure. No boxes are allowed to be placed on the exhibition tables whose dimensions exceed three feet in length, six inches in height when the lid is removed, and eighteen inches in width from front to back. A handle at either end is desirable which should drop into the wood so that the ends may approach closely. The box may be filled with moss, into which zinc tubes may be sunk filled with water to contain the flowers.

The tubes may be about three and a half inches deep, an inch wide, with a rim half an inch broad. Nothing perhaps forms so agreeable a ground on which to place the flowers as green moss, which may be gathered in most hollows of woods and from shady banks. It is not indeed a bad plan to place the moss on the boxes a few days before they are wanted, keeping them in a light but shady place, sprinkling the moss with water once or twice daily.

SELECTION OF BLOOMS.

With regard to the choice of flowers, we may presume that he only who has formed a tolerable collection, and must consequently have acquired some taste in Roses, will enter the lists as a competitor, we would therefore say, cut such flowers as appear best at the time wanted, a good variety may be in a bad condition at the time wanted, and a second rate one unusually fine. But the exhibitor must in a certain degree conform to the tastes of others; and there are points of beauty almost universally agreed on. The *outline* of Show Roses should be circular, free from all raggedness; the flowers should be full and the petals arranged as regularly as possible, the larger the flowers the better provided they are not coarse; the colours should be varied with due care. In gathering the flowers, we would say, choose the morning for the purpose ere the sun has risen upon them, or before he has had time to dim their beauty. When the place of exhibition is at a distance, it is usually necessary to cut them the morning before the show. There is full occupation for two persons, beside the advantage of having a second opinion in cases where the merit of two or more flowers is doubtful. It is not always easy to determine this point satisfactorily, for we have not only to consider *what a flower is*, but *what it is* likely to become. The business of one should be to cull the flowers, that of the other to name and arrange them in the boxes. It is desirable that every stage of the flower should be presented to view; but if cut the day before the show, the forwardest should not be more than three quarters blown. Some of the stiff-petalled Roses, which remain a long time in perfection, may be made exceptions to this rule, but their number is few. When the flowers are gathered on the morning of the show some may be full blown, when less judgment and foresight are necessary in selecting.

Some little success perhaps depends on the way the flowers are arranged. This requires a little study, and we would take nature for our model. Let the exhibitor walk among his plants occasionally with an eye to this point, and he will not fail to single out certain flowers remarkable for elegance of position; this is the true source from which to copy. A few leaves should be gathered with each kind, for the grace and beauty of the flowers are materially heightened by the judicious arrangement of foliage; and this is a point by which we may judge of the habits of a variety. As to the arrangement of colours, little need be said on that point. Much will depend on the materials in hand. Contrast should, we think, be aimed at, but with regard to the exact tints fitted for each position the eye of him who arranges is usually best qualified to determine. A neat and commodious method of naming is to procure some deal sticks, about four inches long and half an inch wide, gradually tapering to a point. Let them be painted white, the names written in a round legible hand with a good dark pencil, or small strips of cardboard, the names written in ink, placed in the front of each sort, are both neat and convenient.

But the flowers are arranged, and what is to be done with them during the interval that must elapse ere they depart for the scene of competition? Shall the lids be placed on the boxes and the flowers be kept closed from the air? By no means. Seek as cool a place as possible, where there is no draught and where the light is not too strong. There place them till the time of departure. So necessary do many exhibitors consider it, that the flowers should not be wholly closed from the air, that they have several holes made in the ends of their box-lids with a small auger. This I have found by experience a capital contrivance to admit the dust; and if these holes are made use of, they should be stopped with corks when travelling on a dusty road.

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Exhibiting Pot Roses.

But besides the flowers of Roses the plants are exhibited grown in pots, and it remains for us to say something of them. The advantages gained by their introduction are, that the character and habit of the varieties are shown. Cut Roses create a great display, but Pot Roses afford us more information. We may propose to ourselves, while viewing them, these questions:—What is the habit of the variety? Is it a free bloomer or otherwise? Is it a good trusser? These questions cannot always be answered by presenting a mere flower, or bushes of flowers; but the introduction of Pot Roses offers the means of a ready solution. In cultivating these for exhibition it is necessary to grow at least double the number required to be shown. This is no overdrawn calculation, as all who have had any experience in the matter will testify. There is no difficulty in flowering *every plant*, but there is a difficulty in bringing all to perfection by a given time. Remember the Rose is one of the most ephemeral of flowers, and the day of exhibition is a fixed one. These facts, however, should deter no one from growing for exhibition, for they affect all exhibitors alike; all fight on equal ground, and the greater the difficulties to contend with the greater is the triumph when achieved

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THE MELLOCO.

For some years past both botanists and horticulturists have been striving to obtain either a substitute for the Potato, or some other species of tuberous Solanum that could be crossed with the ordinary potato, whereby a race of hybrids might be obtained that would be practically disease proof. Up to the present time these experiments have met with only partial success. Messrs. Sutton and Sons and several other large growers, have, however, recently succeeded in raising hybrids from *S. tuberosum* (the potato) crossed with *Solanum Maglia* and *S. Jamesi*, and from these great results are expected. The *Gardeners' Chronicle* gives the following account of *Ullucus Tuberosa*, a new tuber that is now being tried in England.

"Early last year two tubers of this plant were received at Kew from Caracas, and from them a batch of young plants was obtained and planted out of doors in a prepared bed in June. The result of this experiment, together with a few particulars as to the esculent properties of the tubers, may be worth recording, as I believe several gardeners, among them being the Messrs. Sutton, have obtained tubers of the *Ullucus* from Kew with a view to giving it a trial. The two Caracas tubers mentioned above were as large as hens' eggs, rather longer and somewhat flattened, the skins red as in some potatoes. These when placed in heat rapidly developed shoots, which were removed as soon as they were strong enough to form cuttings; in this way about a hundred sturdy young plants were obtained and made ready for planting out of doors in June. They were planted in a light, sandy, well-manured soil, in a position fully exposed to sunshine. Here they grew quickly, forming by the middle of August tufts of shoots and leaves one foot across. They were earthed up as for potatoes, and the strongest shoots pegged down and partly covered with soil, though the latter proved unnecessary. At this time there were no tubers or any signs of them; on again examining the plants in September we were surprised to find no tubers had yet been formed The plants were now very strong, and it was therefore concluded that instead of forming tubers the strength of the plants had "run to leaves." We gave them up, no further notice being taken of them till the frost came, when on perceiving that a frost of four or five degrees did not injure the foliage, we again examined the plants and found an abundant crop of tubers just below the soil, and varying in size from that of peas to pigeons' eggs. The plants were left till the haulms had been destroyed by cold, after which the tubers were gathered. On cooking some of the larger ones for half an hour, we found them still rather hard, and with a flavour of potatoes, almost concealed under a strong earthy taste, quite disagreeable and soap-like. Considering how short a time these tubers had had to grow, it is not improbable that their hardness and disagreeable taste were owing to their being unripe; no doubt young green potatoes (these Ullucus tubers were partly green) would be quite as nauseous as these were.

We are told that the Ullucus is extensively cultivated in Bolivia and Peru, in the elevated region where the common potato also thrives, and with which the Ullucus is equally popular as a tuber-yielding plant. In the *Gardeners' Chronicle* for 1848, p. 862, Mr. J. B. Pentland states that the Ullucus is planted in July and August, the seed employed being generally the smaller tubers that are unfit for food, and is gathered in during the last week of April. These two periods are the spring and autumn of the southern hemisphere. The mode of cultivation is in drills, into which the root is dropped with a little manure. The climate even during the summer season is severe, scarcely a night passing without the streams being frozen over, the sky being in general cloudless at all periods of the year except during the rainy season (December to March), mean temperature about 49°. This information seems to support the view formed of this plant from its behaviour at Kew last year, namely that the tubers are formed on the approach of cold weather, and that so long as the weather is warm and bright, leaves only are developed. Plants grown in houses where the temperature has not been allowed to fall below 50° in winter did not form any tubers although they were in good health. We found no tubers on the plants out of doors till after the return of cold wet weather. It seems likely that this plant does not develop tubers unless its existence is threatened by cold; at all events, such a conclusion seems reasonable from the above statements.

Possibly a wet and rather cold autumn would be favourable to this plant, and the production of its tubers,—such a season for instance as would be most unfavourable for the common potato. It would be worth while testing the Ullucus for low and cold situations where the potato would not thrive. There is not much probability of the former ever proving a substitute for, or even a rival of the potato, at least in this country, but there is room for another good esculent, and the Ullucus is prolific enough, hardy enough, and we suppose, when properly grown, palatable enough to be worthy a trial. In the *Gardeners' Chronicle* for 1848, page 828, will be found a most interesting detailed account of experiments made with this plant in France by M. Louis Vilmorin.

ORCHIDS ABROAD AND AT HOME.

(*Continued from page 113.*)

Home Culture.

As regards practical cultivation, I need say but little; one may do more good by suggestions than by definite advice. In visiting many nurseries and private gardens as I do in the course of a year, one fact must strike even the most general observer. It is this: you find all sorts of houses, span-roofed, lean-tos, raised, sunken, different roof pitches and aspects, while some are sheltered and others exposed, and yet with all this variety one finds Orchids cultivated in each and all of these, with results far nearer an average than one would expect to find them. In no two places are the houses, the composts, the temperatures, or even the water, alike, and this brings us to a great central fact in all good gardening, a fact exemplified in horticulture every day, viz., that "there is more that one way to Rome." We are told that "all ways lead to the Eternal City," and so it is in Orchid culture; there are many different, or apparently different, roads to success. This fact renders it most difficult to give definite and useful advice in print. The "good cultural practice" adopted under one set of conditions becomes wholly, or at least partially, wrong associated with other surroundings.

A juggler not unfrequently keeps four balls flying over his head with one hand, and the successful Orchid grower has to deal quite as cleverly with heat, air, light, and moisture. These are the main factors he must keep going with his head as well as with his hands. Heat, ventilation, and moisture are easy to manage;

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light is less under our control. True, we can limit its too ardent influence by shading; but what we want is a shading which, while intercepting the heat-rays, does not rob us of the actual light. Now-a-days good Orchid growers build lighter houses, and only break or diffuse the sun's rays, instead of totally obscuring them, as was formerly the rule. The old idea of growing tropical Orchids in hot, darkened glass-roofed tunnels is exploded for ever, and with it the old "bake and shrivel" system of resting also has departed. More air is now given, and it is given more carefully than formerly, and the temperatures are not raised at night as was formerly the rule. Altogether, not only are even amateur growers more successful than formerly, but that old "bogie" of the earlier orchidists, viz., "spot," has been well-nigh banished. If "spot" appears in an Orchid house to-day, it is not thought of as a zymotic disease, but the cultivator at once knows that some error of his own is the primary cause.

Compost for Orchids.

As to this, four things are necessary: Good brown fibrous peat, fresh Sphagnum Moss, picked and partially dried, crocks, and clean charcoal. Now and then a little fibrous loam will be required for strong-growing plants, such as Cymbidiums, Cypripediums, Calanthes, Phaius, and Pleiones. Even the delicate little Anæctochilus grows best in clean loam-fibre and Sphagnum Moss The difficulty is to obtain good peat, and whenever a sound sample of the right sort ("sods as tough and as fibrous as door-mats," was the description given to me by a famous old Orchid grower when he sent me as a boy to the peat-stack for a supply) is found, you can scarcely do wrong by obtaining too much of such a "good thing."

All sorts of dark coloured greasy kinds of peat are useless, indeed actually injurious to Orchid roots, since it soon washes down under the watering pot into black mud. Washing is after all a really good test for peat. Bad samples you can wash all away like so much soap, but of a good tough fibrous sample only the sand and small earthy particles in the interstices of the fibre will be dislodged by washing. The same is true to a certain extent of the best of loam; it should possess a large proportion of fibre, which no washing can remove. This especially should be the case with the loam used for Orchids.

Sphagnum Moss is a grand aid to success in Orchid culture, and especially so when of good quality. The best I have ever seen is found near Stirling; indeed it seems stronger and tougher in the north than elsewhere. Of late years it has been extensively employed; indeed as a fact it is interesting to notice that Orchids generally, and especially the cooler growing of mountain Orchids, were never grown successfully until the use of Sphagnum or bog Moss became general, just as some other Orchids, as Catasetum, Cycnoches, Gongora, &c, have never been well grown since the old "bark stoves" heated by flues went out of use.

Potting Orchids.

This is really a simple method, and my golden rule is never to pot a plant until after it has commenced to grow, and the best time for the operation is as soon as ever the indications of new roots appear. If repotted just before the roots actually do appear from the new growths, the compost is fresh and sweet for them, and they seldom fail to take advantage of it. There is no special season for repotting Orchids, but the cultivator must watch his plants like babies and learn to feed them just in the nick of time. For small plants the shallow suspension pans are best, but all large-growing things such as Cattleyes, Lælias, Lycastes, Vandas, Aerides, &c., must be grown in pots. Some growers use perforated pots, others rough glazed ones for the sake of cleanliness, while many use common garden pots of the usual pattern, and in all three cases the practical results are pretty much the same. One main point is to secure plenty of drainage. This is a point amateurs are apt to overlook; but the fact is, the more water a plant requires the more drainage should be given, otherwise the compost soon becomes stagnant and sour. My own plan is to place large concave crocks over the hole at the bottom of the pot, taking care first to enlarge the drainage hole, which the potters always make too small. Then a deep layer of small crocks is added—a layer of very small ones being placed along the top. Over these a layer of dry Sphagnum is placed to prevent the compost from filtering through and blocking up the drainage spaces. Over this the roots of the plant are placed and surrounded by the compost, which, as a general rule, will be two parts of brown fibrous peat, one part of Sphagnum Moss, and one part of charcoal nodules and small crocks mixed together. The compost should be packed quite firmly around the roots. This is important, for if the compost is loose, two evils result from it. First, the plant is not firm, but shaky, in which case no Orchid thrives well; and, secondly, loose compost retains too much water, and so is not only wetter, but colder than if it were tightly packed. It is not the quantity of water poured on the roots of a plant which influences it for good or ill, but the quantity actually absorbed and retained by the compost, and my own experience is that those Orchids are most healthy which require watering most often, and in order to ensure this desirable state of things the compost must be firm and on a well-drained bottom. Then, no matter how much water is given, only a certain quantity, namely, that absorbed and retained by capillary attraction, can remain. I find in practice that for all hard-leaved, pseudo-bulbous Orchids, such as Cattleyas and Lælias, you can scarcely pot them in too little compost, and that little can scarcely be too firmly pressed into the pots. Some grow such plants as Odontoglots and Masdevallias quite successfully in a compost of Sphagnum Moss and crocks; but if your atmospheric conditions of heat and moisture are all right, the compost is not so important a matter after all, provided, of course, that it be sweet and well drained; but even of the sweetest and best of composts, one had better have too little than too much.

As to the staging or arrangement of Orchids, there is a point to which I attach a good deal of importance. It is this, always stage your plants when you first receive them, so that their young growths point towards the light. It is, to many young gardeners, a simple matter; but, from experience, I know that it is a matter of great importance to the plants, and nothing checks the luxuriance of Orchid growths more than suddenly changing the plant round from the light, as is often, thoughtlessly, done after cleaning. This is especially so if the plant has been grown in a lean-to house, or in a partially shaded corner. It is particularly dangerous in the case of such stiff-leaved plants as Cattleyas, Lælias, &c., since, when once their leaves are formed towards the sunlight, and poised at the best angle to utilise its action in any one position, they cannot readily adapt their leaves to a new position. In the re-arrangement of Orchids in houses of the lean-to type this fact is often forgotten, especially when a walk goes down the centre of such houses, since those on one side face the light, while those on the side opposite are frequently arranged so as to look well from the path, and with their backs to the light. Every cottager who grows window plants, such as Fuchsias or Geraniums, is well aware that the "leaves draw to the light," so that the plants become one-sided. But it is not so well understood that when such plants are turned from the light, so as to make them grow bushy all round, that growth-energy is actually wasted in that way. The market-growers found it out, however, and there are now many acres of glass-houses near all our large towns without a single side sash or upright pane, while to prevent this "drawing," which in plain language means "more light, if you please," they place their plants up near to the glass when small, and gradually lower them as growth goes on. It is impossible to give the majority of epiphytal Orchids too much light in our climate; and one great desideratum to-day is some kind of glass, or of shading material which should let through all the light rays, and neutralise the heat rays only of the spectrum. Certainly, in countries near the Equator the plants receive twelve hours of sunlight only, while in our northern gardens the light is of several hours longer duration during the summer months; but, after all, the quality of our light is inferior, and it is further neutralised by glass roofs, and often still further by defective shading materials. The flower-producing effects of light are well known, and when the practical orchidist fails to bloom any particular Cattleya or Dendrobe under pot culture, he generally at last succeeds by transferring the plant to a teak basket, or by suspending the pot with wires to the roof.

Shading Orchids.

As to shading, whatever kind is necessary should be movable, easy to roll up or down on a light roller. Coarse hempen or

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woollen threads woven crosswise, the meshes a third to half an inch wide, are sufficient to break the hottest of sunshine if elevated from 4 in. to 6. in. above the glass of the roof. So arranged, each thread casts a glimmering shadow, and the result is a breaking or diffusion of light rather than an actual obstruction of the sunshine itself. In other words, a far larger proportion of heat rays are obstructed by open shading (thus elevated above the roof) than of light rays—a result most to be wished for during the hottest of sunshine on glass roofs. Especially is this to be wished for in the case of what are called "cool" Orchids, which suffer far more from excessive summer heat than from a moderately cold winter temperature. When shading canvas or tiffany is elevated a few inches above the glass, a current of cool air finds its way underneath and with the best effects. All kinds of permanent or fixed shading materials, whether coloured glass, whitewash, summer cloud, or tiffany tacked permanently to the rafters, are wrong, so far as they obstruct the light during dull or cloudy weather, when, of course, they are not needed. Of course I know such shading is now and then very convenient; but, at the same time, their presence in dull weather renders them wrong in principle, however useful in emergencies.

Resting Orchids.

This is always a contested matter; but it is quiet certain that Nature intended the pseudo bulbous species to rest, or perhaps I had better say to be prepared to endure lack of moisture at some period in their yearly growth. In our garden practice we may "rest" our Orchids in various ways. Firstly, by allowing the compost to become comparatively dry (but not so much so as to induce shrivelling). This dryness is, of course, after the season's growth is fully made. Secondly, by removing such plants for a time to a cooler and more airy atmosphere. Thus, some few Orchids of the cool-house class might be rested in a cold pit or frame during the summer months, since Mr. Smee tells us that Odontoglossum Alexandræ and O. Rossi withstood 8° and 11° of frost respectively in his open-air garden at Wallington. Of course this was simply an experiment, for, as a matter of fact, I should not like to say that a Daisy or a Dandelion is improved by the action of frost. Thirdly, by cutting off the flowers as soon as, or soon after, they have attained to their full perfection. The old plan of growing Orchids in a hot and shady house during the day and the "firing-up" system at night is, I hope, now exploded, together with the combination of "roasting and baking," under the name of rest, alike wrong in practice and in principle. Because Nature herself does sometimes shrivel up her Orchids in exposed positions during an exceptionally dry monsoon, it does not follow that the plants even there are really benefited by the vagaries of climate. Indeed, I am fully assured that they are not so benefited any more than are our most exposed meadows or fields during a dry hot summer, or than are our native Daisies and Buttercups by a frost below zero. Let us ask ourselves what is a pseudo bulb after all? It is a storehouse, a savings bank, in fact, of acquired capital, no doubt in the first instance developed from swollen petioles or leaf-stalks especially for the purpose of enabling the plant to live under widely varying extremes of moisture and of drought. Here we find Nature herself supplying a compensation clause, or, in other words, she teaches thrift by enabling her Orchids and other plants to lay up stores of potential food, so that they may be prepared for "a rainy day," or, in other words, a bad time. Hence, as we have said, even if Nature actually does shrivel up her Orchids and other bulbs, such shrivelling is an actual loss for the time being of that stored-up food, or energy, or capital, call it what one may, which was originally intended to enable the plant to meet calls due on its energy at flowering or seeding time, or to live on through those occasional periods when climates and seasons get a little awry.

Syringing Orchids.

The question of syringing is one of those cases wherein "doctors agree to differ." Mr. O'Brien in his paper on "Orchid Culture," read before the Orchid Congress in May last, deprecates the use of the syringe. I do not, feeling sure that in the right place and on the right plants its use is most valuable. All the thin-leaved Dendrobes of the D. Falconeri and Devonianum types, Disas, Pleiones, Coelogynes, Cypripediums, and most "cool Orchids" thoroughly enjoy careful syringing, and its due use is death to the red spider and banishment to thrips. Of course I should never syringe thick or hard-leaved plants such as Cattleyas or Lælias, and in the case of Vandas, Aerides, &c., one must be careful in its use; but all these plants are refreshed by a light dewing from a fine-rosed syringe after the hottest of summer days, and more especially in large, dry, and airy houses. In such houses syringing is a necessity if the lower leaves of Vandas are to be retained.

In a state of nature all Orchids are drenched with rains during the wet monsoon while their annual growth is being made, and it is worth while remembering that the bulk of tropical rainfall falls at night. After the hottest of hot days showers are the rule at night, and if not rain, then the heaviest of dews. An old South American collector long ago told me that in Bogota (where Odontoglossum Alexandræ and several Masdevallias are found) the warm moisture from the plains or from the sea comes up every night, and condenses in the cool atmosphere of Bogota (alt. 8000 feet), so that every morning a white mist hangs over everything until it is dispersed by the sunshine. Early in the morning every leaf-blade of Grass or mossy growths are not merely wet, but drenched by these heavy nightly dews. As a matter of fact, this state of things takes place on the mountains nearly everywhere throughout the world. It is so on Table Mountain, in Cape Colony, where Disa grandiflora grows wild. It is so in Borneo, where the finest of Nepenthes are found, and no doubt the same is true on the Andes and on the great chains and peaks of the Himalaya. This is a state of things not easily to be imitated in our Orchid houses at home, and consequently we fail to grow many mountain plants in our cool green-houses at home simply because we keep them too dry. At the same time the syringe should be used with discretion. It is like a rifle, or a spirited horse—most useful to those who best understand its use, and in good hands I am convinced that the syringe is one of the most useful of all the implements in the garden.

Colours of Orchids.

Let us now say a few words about the prevailing colours of Orchid flowers. Why are so many species distinguished by having yellow flowers? After yellow, green and white blossomed kinds are about equal. Then comes a group in which red colouring steps in to compete with the yellow hue, the result being brown-shaded or brown-spotted flowers. Pure red-flowered kinds are very rare—scarlet or vermilion still more rare, and blue the rarest of all orchidaic colouring. Why is this? Why is the heavenly blue, so lavishly bestowed on the field Flax, the graceful Blue-bell, or the mountain Gentian, denied to the royal family of Orchids? This question seems all the more puzzling because in Iridaceæ, which resembles the Orchids more nearly than any other popular Natural Order of garden flowers, there is a very large proportion of blue or blue-tinted flowers. We have here a most interesting problem. Mr. Grant Allan, who has written an interesting little work on the "Colours of Flowers as Applied to the British Flora," would no doubt tell us that it is a question connected with the evolutionary progress of a younger Natural Order—the gradual unfolding of Nature's Laws in a way not at present fully understood. The word evolution reminds me that even botany itself as a study is subject to its sway. We had the Linnean system, which we may call the botany of eternal signs or numbers, then came the structural or anatomical period, then the functional or physiological, and some day no doubt the botanist will be able to tell us all the secrets of Nature's laboratory—how she so cunningly compounds her subtle flavour and aroma in fruits, her colours and perfume in flowers, until, as the ball of evolution rolls on through the coming ages, our great grandchildren will in the infant schools of the future be taught:—

> What the Lilies say to the Roses,
> What the songs of the butterflies be.

In conclusion,' I may add that there is "no royal road" to Orchid culture except the long and certain one of observation and practical experience. I have often heard it said after a man has grown some particular thing better than his neighbours that he never grew any Orchids before. Perhaps not; but if a born gardener grows good Grapes, or good Pelargoniums and Crotons, I think one might trust him with a few Orchids. If once such a man takes

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to any set of plants and really studies their wants, he is sure to succeed with them. But Orchids demand the greatest care—the most acute observation. There is no chance of a "short cut" unless, as now and then happens, wealth is added to intelligence and a deep-laid love for them. Some amateurs manage to get "over the garden wall" in this way, but after all, Orchids of the really showy and most useful kinds are now sold so cheaply that there is a large measure of quiet enjoyment, and a more than moderate amount of success in their good culture to be enjoyed without the display of what one may call "purse rivalry," or, in other words, of extravagant competition.

CALCUTTA FLOWER SHOW, 1886.

Schedule of Prizes to be awarded at the Annual Show, to be held in the Gardens at Alipore, of the Agricultural and Horticultural Society of India, on Wednesday, the 10th of February, 1886.

PRIZE LIST.

No. of Class.	Class.	Amount of Prizes First. Rs.	2nd. Rs.
	Growing Plants.		
1	For the best collection of Plants and or Flowers of any number of kinds.—**The Grant Silver Metal.**		
2	Camellias, not less than 6 plants, in Flower, ...	6	4
3	Do. do. 3 do.	3	2
4	Orchids, do. 3 dissimilar kinds, in Flower,	4	2
5	Do. do. 2 do. do. ...	2	1
6	For the best specimen Orchid, ...	6	5
7	Roses, not less than 12 dissimilar kinds, in Flower,	10	6
8	Do. do. 6 do. do. ...	4	3
9	For the best specimen Rose, ...	8	5
10	Ferns, not less than 12 dissimilar kinds, ...	10	6
11	Do. do. 6 do. ...	4	3
12	For the best specimen Fern, ...	8	5
13	Begonias, not less than 12 dissimilar kinds, ...	14	7
14	Do. do. 6 do.	6	4
15	Panax and or Aralias, 10 do.	8	5
16	Do. do. 5 do.	5	2
17	Dracœnas do. 12 do.	10	6
18	Do. do. 6 do.	4	3
19	Dieffenbachias, do. 6 do.	6	3
20	Do. do. 3 do.	4	2
21	Crotons, do. 24 do. ... well grown,	15	10
22	Do. do. 12 do. do. ...	8	4
23	Do. do. 12 do. new & rare varieties ...	12	6
24	Do. do. 6 do. ...	6	3
25	Coleus, ... 15 dissimilar kinds ...	8	4
26	Do. ... 8 do. ...	4	2
27	Verbenas, ... 6 do. in Flower, ...	7	4
28	Asters, ... 6 do. do. ...	7	4
29	Pansies, ... 6 do. do. ...	7	4
30	Phloxes, ... 6 do. do. ...	5	3
31	Petunias, ... 6 do. do. ...	5	3
32	Portulacas, ... 6 do. do. ...	5	3
33	Geraniums, ... 3 do. do. ...	5	3
34	Nasturtiums, ... 6 do. do. ...	5	3
35	Violets, ... 12 pots do. ...	5	3
36	Heliotrope, ...	5	3
37	Foliage Plants, 20 dissimilar kinds, ...	14	10
38	Do. ... 10 do. ...	8	4
39	Rare Plants, not before exhibited, not less than 3 dissimilar kinds, ...	10	5
40	Scented foliage plants, ...	5	3
41	A collection of not more than 20 or less than 15 pots of dissimilar kinds of annuals, or any bulbous or herbaceous plants in blossom	8	6
	Cut Flowers.		
42	Camellias, stand of not less than 6 Flowers, ...	6	2
43	Do. do. do. 4 do. ...	4	4
44	Roses do. do. 24 dissimilar kinds,	16	8
45	Do. do. do. 12 do. ...	5	3
46	Do. do. do. 6 do. ...	5	3
47	Do. for the best single specimen, ...	8	5
48	Bridal Bouquet, of White Flowers, ...	8	4
49	Hand Bouquet, for Ball Room, ...	8	4
	President's Prizes.		

Prizes to the value of Rs. 100 placed at the Society's disposal by W. H. Cogswell, Esq., President, will be given for rare or well grown plants not included in the above list.

	Fruits.		
Bael, best plate of 6	6	4	
Custard Apple, do. 6	4	3	
Citron, do. 12	4	3	
Cocoanut, do. 3 varieties	4	2	
Guavas, do. 6	4	3	
Lemons of sorts, do. 12	4	3	
Mulberries, do. 3 varieties	4	2	
Papayas, do. 3	4	3	
Plums, long variety, best plate of 50	5	3	
Do. round do. do. 50	4	2	
Plantains, best collection of 6 varieties	6	4	
Pumelows, best, 6	4	3	
Pine-apples, do. 2	4	3	
Strawberries, best plate of	10	5	
Sapota, best plate of 6	4	3	
Tipparee, small basket	3	2	
Best Dallie of Fruits, to include not more than one of each kind	10	5	
	Vegetables.		
Asparagus, best bundle of not less than 25.. ...	6	4	
Artichoke, 6	6	4	
Brocoli, 2	6	4	
Beet, 12	4	3	
Cabbage, best, 3 varieties	5	3	
Cauliflower, not less than 3	4	2	
Capsicum, best, 6 varieties	4	3	
Carrot, 12	4	3	
Celery, not less than 2 sticks	8	6	
Cucumber, dish of 2	4	3	
French Beans in pod, best dish of, ...	4	3	
Knol-Khol, not less than 4	4	3	
Lettuce, best, 3 varieties	4	2	
Peas in pod, best dish of	6	4	
Potatoes, 12	6	4	
Pot Herbs, best assortment, ...	6	4	
Sage, do.	4	3	
Tomato, 12	4	3	
Turnips, not less than 4	4	3	
Best Dallie of Vegetables, to include not more than one of each kind, ...	10	5	

INTERESTING VEGETABLE FORMS.

By Rev. L. J. Templin.

To the thoughtful observer almost every vegetable form has something of interest, but to the masses they are generally only weeds or common plants. Even those that have some striking peculiarity soon lose their interest by familiarity. The vegetable kingdom is full of unique forms, many of which, to the common reader, are almost if not entirely unknown. Some of these from their form, habits, or productions, are quite curious and interesting.

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The gourd tribe furnishes some interesting species. One of these—the *Cucurbita claviformis*, grows in the vicinity of Constantinople, and is believed by the people of that country to be the real Jonah's gourd. It forms an almost impermeable shade, under which the Orientals delight to sit and smoke.

The curious fruit hangs down in long delicate clubs, somewhat resembling large, overgrown, candles. This fruit is prepared for food by scooping out the central portion and filling it with force meat. It is then boiled, when it forms a very palatable dish.

Another member of this family is the squirting cucumber, *Momordica Elaterium*, which is remarkable for the strange property it has when ripe of throwing its seed contents to a considerable distance on being touched or shaken. As the fruit approaches maturity, there is an accumulation of fluid in it till it can contain no more, when, on the least touch or jar, the substance about the stem gives way, and the contents are thrown out with force sufficient to carry them several yards, and a report, as of a popgun, that may be heard at a considerable distance. Persons passing near them at such times, suddenly find themselves bespattered from head to foot by the pulpy contents of these vegetable popguns.

In the valley of the Chagres there grow whole forests of the candle tree. From the stems or branches of these depend, the long cylindrical fruits of a yellow wax colour, that so much resemble huge candles, as to have suggested the popular name. The fruit is from two to four feet long, and an inch in diameter. The tree grows to the height of twenty-four feet, and blooms all the year round, but most abundantly during the rainy season; but the principal harvest of the fruit is during the long dry season. The fruit serves as food for cattle, which, when fed on it and some of the native plants, soon grow quite fat. The meat of cattle fed on this fruit has a peculiar, though not disagreeable apple-like colour.

A tree known as the Rain tree, *Pithecolobium Saman*, is found in the dryer parts of South America. This tree grows to the height of sixty feet, and its leaves have the property of condensing the moisture from the atmosphere. So copious is this condensation that a continual shower falls from the leaves and the branches, until the surrounding soil is converted into a veritable marsh. Places that would otherwise be barren deserts, are by this means, covered with the most luxurious forests. It is said that the British Government is introducing this tree into India, to counteract the aridity of portions of that country.

Queensland furnishes a shrub that would certainly make a most unpleasant neighbour. It is the stinging-tree, a very luxurious, pleasing-looking shrub, varying in height from two or three inches to ten or fifteen feet. Though pleasing to the eye it is dangerous to the touch, as the pain it produces is maddening. No mark is left, but for months afterwards the place is tender to the touch in rainy weather, or when wet by washing, or other means. It exhales a peculiar disagreeable odour that gives notice of its proximity, and enables the experienced and cautious to avoid contact with it. So excruciating is the pain caused by contact with this plant, that a man of ordinary fortitude when stung, will roll on the ground in uncontrollable agony. A horse will, after passing through a grove of trees, rush with open mouth at anyone who dares approach him. A dog, under such circumstances, will rush around, whining in a piteous manner, biting and tearing the flesh from the parts affected by the sting.

A recent German publication contains a description of a new electric plant that has been christened *Phytolacca electrica*, which possesses strongly-marked electro-magnetic properties. In breaking a twig the hand receives a shock that resembles the sensation produced by an induction coil. Experiments made on this plant with a small compass, showed that the compass was affected by it at a distance of about twenty feet. On a near approach the needle vibrated and finally began to revolve quite rapidly. The phenomena was repeated in reverse order on receding from the plant. The energy of the influence varied with the time of day—being strongest about 2 o'clock P. M. and becoming almost nothing during the night. It was also greatly increased in stormy weather; and when it rains the plant seems to wither. It is said that no birds or insects are ever seen on or about this plant. The soil where it grew contained no magnetic metal like iron, cobalt, or nickel, and it is evident the plant itself possessed this electrical property.

A bush, the fruit of which is called soap berry, is found in great abundance throughout Alaska. The fruit, when ripe, is a small red berry of a juicy and quinine taste, and is generally biennial. If a quart of these berries be placed in a tub capable of holding a bushel and well stirred, they well form suds or froth that will completely fill the tub. The more it is stirred with the hand, the thicker it becomes, till it can be cut with a knife. A whole family of the natives will gather around the tub and eat this frothy substance with horn or wooden spoons. The taste for it is doubtless an acquired one, but the article is quite popular. The red colour of the berries gives a beautiful pink colour to the froth. The froth may be made from the green berries, but it is not so highly flavoured, and is white in colour. Foreigners mix some of the froth with their wine, sweetening with sugar, when it is claimed to be quite a luxury.

The *Vallisneria spiralis*, a plant that abounds in the rivers of Southern Europe, deserves mention here on account of the strange action of the flowers at the time of inflorescence. The pistillate, or female flower, first appears at the surface of the water in which it grows; there it floats as if in expectation of a companion; soon the staminate, or male flowers, borne on long spiral stems, begin to rise from the bottom, gradually unrolling their long flower stalks till they also reach the surface. They and the female flowers now float towards each other till they meet and touch; this contact results in the fertilisation of the ovules, and immediately they begin to sink again beneath the water, there to perfect and ripen their seeds in safety.

The Melon tree (*Carica Papaya*,) a native of South America, is of interest both for its manner of growth and its usefulness to man. It is a rapidly growing tree, attaining in its fourth year a height of twenty feet; it then enjoys a short maturity and dies. From its quick growth, broad, umbrella-like shade and rapid decay, some have seen in this, or some near relative the melon tree of the prophet Jonah. From the time it attains the height of six feet it produces at all seasons flowers and both green and ripe fruit. The fruit grows around the base of the tree crown, as do nuts of the cocoa palm. When mature it is of a yellow colour, and has the appearance of belonging to the cucumber family. The fruit grows to the weight of fifteen pounds, is shaped like a melon, and is striped longitudinally like that fruit. Both the green and ripe fruit are used for food, the former as pickles and the latter with salt and pepper or sugar. The seeds have a strong flavour, and are used as a spice. The leaves are used as a substitute for soap, for which it answers the purpose well; they are also used to wrap round tough or stringly meat, which it renders tender and palatable in a short time. The tree is of easy culture, and is extensively raised in tropical parts of both America and Africa. It requires but little care, and produces ripe fruit before it is a year old.

The Mahwa tree (*Bassia latifolia*) is a product of the Monghyr district, India, and is much resorted to as a source of food for both man and beast The part eaten is the succulent corolla of the flowers. These fall from the trees in great abundance during the early spring. This is a season of general feasting among the lower animals as well as man. Birds, squirrels and other small animals crowd to the feast during the day, and near night jungle fowls and peacocks come out and dispute their possession with the deer and the bear. As a wholesome nutritious food the Mahwa flowers possess superior merit. As an article for feeding stock this seems to excel in cheapness and abundance, the supply being unlimited, certain yield, the supply having never been known to fail; it also possesses nourishing qualities, and good keeping qualities. —*Gardener's Magazine.*

PERFECTION IN THE DAHLIA.

Can it be said that raisers of Dahlias have yet produced a perfect flower? Take a finely developed bloom of Mrs. Gladstone among the show flowers, and one of Flora Wyatt among the fancy flowers, and one must admit they are approximately perfect, but not entirely so. The raiser has, in his mind's eye, his ideal flower, and he has not as yet reached it, the fact is, his ideal recedes as he advances; all the perfections he has secured

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serve the purpose of enabling to build up an idea in which these shall be intensified, and so he labours on until the fulfilment of his hopes shall be seen in a perfect bloom.

It has been said that a perfect Dahlia should possess eight points, but how seldom is it that a flower can be caught as the growers say, with six or seven of these as prominent as can be desired. Half a point may be lost in the centre or eye, the same in the shoulder outline, and in others also. We have never seen a flower in which we could find all the points that are desirable. There is a deficiency somewhere. That would be a remarkable stand of thirty-six blooms that could average six points each. Every grower for competition should, and invariably does, select the flowers that come nearest to his ideal of perfection. A little practice enables a young beginner to do this with ease. It should always be remembered that a point saved is equal to a point gained.

The qualifications required in the Dahlia may be set forth as follows:—We may say that the eye or centre is the first point to begin with, it should be tight, symmetrical, and well up; if the eye is low, half a point at least is lost; if the flower be too young the centre will have a greenish tinge, and there is a loss also; if stale and open the flower counts nothing, and where strict showing is followed, disqualifies the stand in which it is placed.

The shoulder comes next: it should recede from outline to centre; every row of petals being of the same form, and gradually getting smaller to the finish. Outline is a point of prime importance, it should be as circular as possible; the eye will detect, in a moment, any preponderance to one side or the other. If the petals are not well arranged, the outline is defective. Then depth constitutes another main point. The petals should recede from the outline to the flower stalk, so that the flower may be as near the form of a ball as possible. Flowers that are placed too low on the show-board lose on this point, they should stand half-an-inch clear, at the very least.

Arrangement and substance of the petals are very material points; the want of regularity spoils most of the others. The petals should be round, smooth, and of good substance, level with one another, and all the rows equal in height. A single petal too high or too lows spoils theappearance of the flower. Colour is a pleasing point, and if the flower has other good qualities, and this in combination, it will always tell on a stand, but it is only one point. A flower may be of very attractive colour, but weak in other respects.

Size is also to be taken into consideration. Provided it is not out of all proportion, size, if the flower be fine otherwise, always counts a half or whole point. Uniformity of size in a stand of flowers is of importance, and greatly increases its effectiveness. Full-sized flowers should be 4 ins. to 4½ ins. across, and medium ones 3½ ins. The smallest flowers should be in the front row of the stand, the larger ones behind. Mixing them up with full-sized ones gives a stand an irregular and uneven appearance.

Staleness is a bad point, and detracts from all the others If the centre is old and open the flower is lost; the same if some of the petals tumble from the shoulder. But a flower may lose a few petals at the bottom and only want in depth, and yet be a thoroughly good one in all other respects. Old flowers will sometimes stand long. Some sorts are liable to drop their petals when in water, and all such should be put in dry tubes; but this, for some reason or the other, is not so frequently necessary as it was some years ago.

Judges who are well up to their work can soon tell which stands are likely to take the lead. Two or three will come near to each other, and then it is necessary that flower be compared with flower, beginning at one row and going through with it, noting the merits and demerits of each until the whole have been gone through. Points are not now generally so strongly insisted upon as they were a few years ago. Still, in all Dahlia exhibitions of any moment the best men are selected to make the awards.

In three respects the Dahlia has been materially improved, and they are distinct from those already dwelt upon. In the first place tall-growing plants are now the exception, not the rule. More than that, they are of a dwarfer and more bushy growth, throwing up flowers freely from the bottom as well as the top branches, and instead of the flowers hanging down they are generally erect, and (as an old cultivator remarked not long since) for some reason or the other flowers of Dahlias are much easier to get than they were a score of years ago—that is to say, it is easier to get blooms up to show form than it used to be.—*Gardening World.*

LONDON OFFICE

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EAST INDIA AGENTS,

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Correspondence.

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All matter intended for publication, and all questions to be replied to, should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication, unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer

Extracts.

MANGO INSECT PESTS.

Dr. E. Bonavia writes to the *Indian Agriculturist* in reply to the question of a correspondent, regarding the larvæ of some insect which destroys the mango fruit:—I regret to say I have not studied the habits of this insect, as in the North-west and Oudh mangoes are not often injured in this way, but peaches are. I think it probable that it may be a moth which deposits its eggs in the flower, and when they hatch they work their way into the young fruit, as it sets, and grow with it and ultimately emerge from the ripe fruit. If some of the mangoes containing the larvæ are sent to the Director of the Entomological Department of the Indian Museum, Calcutta, he may take steps to secure the perfect insect when it emerges, and throw some light on its habits, whether a moth or a beetle, which would be a great step. I might also suggest that some one should during the flowering and setting season endeavour to observe what insect—moths especially—visit the mango flowers, either by day or after sunset. They might be able to observe with a large magnifying glass what they are about if they see any. As long as only a few mangoes are spoilt by these insects, it does not much signify, but when the fruit of a whole district is thus destroyed, it is time to study the cause and search for some remedy. If the insect deposits eggs on the young ovary, either before or after setting, some insecticide syringed over the young fruit when set (not while the flower is in pollen) might destroy the eggs or young larvæ before penetrating the young fruit. Tobacco juice in water is often used for destroying insects on plants; caustic ashes in water, and other solutions might be tried, Of course the insecticide should not damage the fruit also. But the first step is to get a clue to the natural history of this insect whatever it is. As it destroys so much fruit, there can be no harm done by making some experiments with a garden syringe or pump, and noting the side of the tree, or

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the whole tree on which experiments have been tried. Some of the very young fruit should be examined with a good magnifying glass to ascertain whether there be any evidence of a hole or broken surface, through which the minute larva may have crept in, and also to cut open the very young fruit and explore it with a glass in every way. In short to obtain a clue how this insect gets into mango fruit, and when and then endeavour to work out its history. If the study of Entomology has any uses at all, a great one is to discover a remedy against the worry insects give us, and the loss they entail. But until we learn something about their "manners and customs," we may be only wasting time in fruitless attempts to circumvent them. Another observation is worth making—are all the mangoes in the districts named attacked by this pest? If there be some which are not, then the seed of those only should be sown there, and grafts from those only taken. The extreme dampness of the climate of those districts may facilitate the ravages of this insect. Other kinds from up-country, such as the solid fleshed ones, safida, bhadania, and others might be also tried. There may be a hundred dodges by which one can oppose these little pests.—*Madras Mail.*

DESTRUCTION OF TREES IN THE PUNJAB.

The destruction of trees and undergrowth on all sides is causing trouble in other parts of India besides the Punjab. One of these places is found in the hill tracts of the Chota Nagpore Division of Bengal, which were visited by the Inspector-General of Forests last winter. In his report, Dr. Schlich states that the floods of the Damodur river, which of late years have done much damage in Burdwan, are largely due to the clearance of forests in the upper catchment basin, much as the floods which afflicted the Hooshiarpore and Jullundhur districts some years ago were due to the destruction of forest growth on the Siwaliks. The state of things is more serious perhaps in Chota Nagpore than is usually the case elsewhere in India, as attempts have been made for some years past to induce the people to form reserves of their own, and to refrain from their evil treatment of forest areas; and these attempts have so far proved a complete failure. Dr. Schlich proposes that the people should now be urged to apply to Government to manage their forest lands for them; and if this cannot be done, areas of waste land should be leased by Government from the people: and that if this again is impracticable, Government should buy up waste areas. The first proposal is not likely to bear much fruit, as far as the Forest Department is concerned. If there ever was a case of *timeo Danaos et dona ferentes* it is, whether rightly or wrongly, the case of the people of India and their Forest Officers. Leases are perhaps possible, but it is difficult to secure them without the exercise of much official pressure. For the purchase of lands on the other hand, money is seldom forthcoming; although the Forest Department might fairly claim to have a percentage of its net annual earnings put aside to enable it to lease and buy lands as opportunity offers. The whole question is one beset with thorny difficulties. On the one hand, it is, most necessary to restrain the people from their present wasteful practices and to prevent their squandering a property which belongs in some sense to the public and in a distinct sense to future generations of the owners of the land on which the forests stand. On the other hand, the customary rights of the people have grown so strong that the attempt to put an end to them, is apt to shake the village constitution and faith to its very foundations. The question, however, requires to be considered from a broad point of view, in order that distinct principles may be laid down, once for all, for the clear guidance of officers with regard to it. There is no matter upon which opinions differ so widely at present, or on which views are so apt to change violently according to the personal ideas of an individual officer. We believe it is the intention of the Punjab Government to reserve large areas for the formation of plantations in the west of the province as the colonization of that country proceeds. And if the development of trees, and canals in those tracts should prove successful in increasing the rainfall, the great-grandsons of the present generation may see areas, which are now absolutely wastes, become one of the principal sources of the timber supply of the Province.—*Civil and Military Gazette.*

PRODUCTION OF NEW FRUITS.

In fulfilment of my promise to urge upon you while I live the importance of producing from seed new improved varieties of fruits adapted to the various soils and climates of our vast territory, I have substantially to repeat what I have said in my former address. These are the means, and the only means, which God and Nature have provided for the improvement of our fruits, and the better we understand and practise them the nearer shall we approach to that divine beneficence which gives flavour and richness to our fruits, and to the sense the highest types of beauty, grace, and gratification.

Thus from time to time I have spoken to you, and, were these my last words, I would again impress them upon you as of the utmost importance. With a careful study of the tendency of the varieties, and a judicious selection of parents, as breeders, we shall go on to produce fruits which will be adapted to every climate or condition of our land where any species of fruit may be grown. When we see what Nature has done without the aid of manipulation in the cold region of the North, as in Russia, from whence came the Oklenburg and Tetofsky Apples, the Black Tartarian Cherry, and other good fruits, as seen by Professor Budd and Mr. Charles Gibb, who can doubt our ability to produce fine fruits, even in the colder regions of our country?

When we consider that the art of crossing varieties for their improvement was scarcely known until our day, and see what wonders have been accomplished by it, who can doubt that we may yet produce a Pear with the richness of the Seckel, the form and size of the Bosc, and the vigour and productiveness of the Boussock? And so we may go on to improve other fruits, until all shall be made as perfect as ever were grown by "the grand old gardener" in Eden. But to do this we must study the characteristics of varieties, and thus help Nature to perfect this work.

Thus Providence has placed in the hands of man a power to assist Nature in the production of her most perfect and beautiful creations. But whatever some may think of variation, evolution, transmutation, or transformation of species, the great fundamental laws of life and its reproduction will remain unchangeable and immutable as long as the earth bears a plant, or a tree yields a fruit, or Nature holds her place in the universe.

Nature is a kind handmaid, and, by her lovely creations is constantly inviting us to come up and assist in her glorious conquests. Her voice is heard throughout the earth To us, she says: "Come up and sit with me and you shall have plenty and perfection. Come, and I will give you fruits which shall delight the eye, gratify the taste, and satisfy your souls."

O! Yes! Thou Queen of Grace,
We'll come and take thee at thy word;
We'll take thee, Nature, as a bride,
And, hand in hand and side by side,
Our loves and labours we will join,
And bless the hand that gives us thine.

We have now many excellent varieties of fruits from foreign lands which are suited to many of the soils and climates of our country. But when we reflect upon the number that have proved worthless, and are not suited to our condition, and consider the large number of good American sorts that have been raised, we are forced to the conclusion that we must, hereafter, rely mainly on the production of new varieties from seed to supply the necessary kinds for our constantly increasing territory for fruit culture. We therefore rejoice in the great interest which has been awakened in this subject, so that what was a few years ago considered by physiologists and philosophers a mysterious art or science, is now practised extensively by cultivators in the various families of vegetable life. And now that we have the knowledge of this art, there is no limit to its use for the improvements we may desire; and, strange as it may seem that the knowledge of this process of helping Nature was withheld from us until our day, it is capable of indefinite application as long as the sexes of plants shall be known, and is the only means to revolutionise and improve the fruits of the earth.

When we reflect on the improvement which has been realised by cross-fertilization in the various species of the vegetable kingdom, we can scarcely fix a limit to its potent influence for good on our fruits; and we may thus go on from one degree of excellence to another, until we shall produce fruits as fine as were ever grown by our father in Eden. Go on prospering and to prosper in this most promising and beneficent work. You can do nothing

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better for the generations that are to follow us; and so again, with line upon line, and perhaps for the last time, I leave with you my old injunction: "Plant the most mature and perfect seeds of the most hardy, vigorous, and valuable varieties; and as a shorter process, insuring more certain and happy results, cross and hybridize our finest kinds for still greater excellence." Go on! Go on! while you live, and when we are gone, others will rise up to chant our old song:—

Plant the best seeds of all your best fruit,
Good fruits to raise that some lands may suit;
Fruits which shall live their blessing to shed,
On millions of souls when you shall be dead.

Plant; plant your best seeds—no longer doubt
That beautiful fruits you may create;
Fruits which, perchance, your name may enshrine,
In emblems of life and beauty to shine.

Thus have I summed up some of the most important considerations and suggestions of my former addresses, thinking that I could do nothing better than to call your attention to them again, and reinforce them as principles upon which must depend the successful prosecution of our work.

And now, gentlemen, in conclusion, let me again congratulate you on what our Society has already accomplished. "The past is secure"; but the great duty still remains of extending, fostering, and rightly directing the pomology of our country

Other societies have arisen, and will continue to arise, and help forward our noble designs; but the American Pomological Society will still bring together the most distinguished cultivators of our land, and will be the great head, guardian, and guide of the pomology of this western world. When we reflect on what has been accomplished in the thirty-seven years of its history, and think of the immense territory in our favoured land which is yet to be occupied with fruit culture, and of the increasing demand for these products so necessary for the health and happiness of life, we feel the great responsibility which rests on us as protectors and conservators of one of the most important branches of American husbandry. Let me then urge you to persevere in this work, and preserve our bond of union throughout the land. "Union is strength"; and in nothing is this better illustrated than in the associated efforts which have given such influence and importance to our Society. Perpetuate it, that the blessings which it confers may go down to posterity, and grateful millions shall bless the memory of those who laid its foundations, and shall aid in carrying out its benevolent designs. Think once more my friends of the great blessings which you may confer on mankind by the multiplication of good fruits. Next to saving the soul is the saving of health, and I know of no better means than an abundant supply of ripe fruits.

Fruits are the overflow of Nature's bounty; gems from the skies which are dropped down to beautify the earth, charm the sight, gratify the taste, and minister to the enjoyment of life; and the more we realise this, the more shall we appreciate the divine goodness to us, and the duty of providing them for others.

Like morning's first light, that gladdens the sight,
So may the best fruits spread over the earth.
And when we shall reach that still fairer land,
And round the life-tree in mercy shall stand,
May each pluck its fruit, and nevermore feel
The serpent's sharp tooth, once close at his heel.

—Extract from an address by the Hon. Marshal P. Wilder, delivered at the twentieth session of the American Pomological Society.

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Editorial Articles.

THE CALCUTTA FLOWER SHOW, 1886.

In another column will be found a list of the Prizes awarded at the Flower Show held in the Gardens of the Agricultural and Horticultural Society of India at Alipur on Wednesday, the 10th instant. Lengthened, and in some instances very elaborate, reports have been given in all the daily journals of the results of the show, so that it is hardly necessary for us to make any remarks on the subject, especially as our comments on the exhibition of last year, although written in the kindest spirit, appear to have given umbrage in high quarters. This we extremely regret, not for our own sakes, but for the sake of that harmony that should exist among those who are striving to attain the same object, that is, to promote the welfare of horticulture. We are fully convinced that the executive body that control the affairs of the Society are actuated by no other motive than this in undertaking these exhibitions, and also that they are fully satisfied that the arrangements made by them are the best calculated to attain that end. And it is only on this point that we venture to differ from them. Our ideas on the subject were so fully expressed in our issues of February 3, February 17, and March 3, 1885, that it is unnecessary for us to go over the same ground again: suffice it to say that the result of the present season's show has the more firmly convinced us that, as at present constituted, the shows are not popular with the horticultural public, and that till some radical changes are made, they will never become so. If we turn to the list of prize winners, we shall find that the whole of the awards for plants in the first 41 classes, with the exception of three prizes of nominal value, were divided amongst five exhibitors—one nurseryman, two public gardens, and *two amateurs* only. Can this be considered a satisfactory result?

SCHOOLS OF HORTICULTURE.*

Horticulture may be considered to bear the same relations to botany as manufacturing chemisty does to general chemistry. In fact, horticulture is merely the application of botany to practice, nearly all the daily occupations of the gardener being founded on a basis of scientific rules. It is therefore plain that the study of this science should occupy a prominent place in the programmes of schools of horticulture, but it is important to point out what the nature of the teaching should be, in order to be truly useful.

* A paper read at the Antwerp Horticultural Congress, by Professor Kickx.

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Theoretical Instruction.

This should be carefully adapted to the special requirements and capacity of the pupils. The requirements for the preliminary examinations in the Belgian school are far from being difficult. They only require that the pupil should possess that slight amount of knowledge which may be acquired in a primary school. The regulations also allow the admission of pupils from the age of fifteen years. It usually happens that these lads have not had a sufficient education to understand anything more than an elementary course. The Professor should therefore endeavour to make his instructions as simple as possible, and employ all the means in his power to make himself understood. He will succeed the better in proportion as he makes his course more practical. To this end we should make use of fresh plants or dried specimens, museum specimens, diagrams, &c.; in short of every thing which appeals to the eye. Under these circumstances a junior pupil will understand and remember the explanations given. This theoretical course should be extended over two or three academic years, and should comprise general botany and special botany. In general botany the elements of anatomy should be studied, the forms of organs, and above all physiology. It is important that the gardener should have an idea at least of the structure of the different parts of plants and of their uses. He must know the details of the phenomena of the life of plants, in order to place plants under the most favourable conditions for their growth. To mention only a few examples chosen at hazard, how can he regulate the watering of plants if he is not acquainted with the mode of action of roots and leaves, with the phenomena of absorption and evaporation? How, if he ignores the peculiarities relating to sexual reproduction, will he proceed in any intelligent manner to effect artificial pollenisation and hybridisation? A very important chapter of the programme of general botany which must be taught to the horticultural pupil is the study of the influence of external agents—for example, light, heat, electricity, the soil, &c.—upon plants. The two first of these especially are concerned with a number of physiological phenomena which the gardener meets with in his daily work. He must understand the influence of temperature in order to manage the germination of seeds successfully, the ascent of the water of evaporation, the ripening of fruit, seeds, &c. He should know how to regulate in an intelligent manner the operation of heat and light in his flower and fruit houses. If gardeners had clear notions of the part which rays of various-coloured light play in the functions of life, we should not have seen advanced a few years ago the absurd idea of covering greenhouses with blue or violet glass in order to hasten the maturity of Grapes.

The study of vegetable pathology, which in most schools forms part of a course of botany, is also of great interest to horticultural pupils. The subject might even form the object of a separate course. Be this as it may, however, in this report I may be excused from dilating on the subject, because it will receive special attention at the hands of the Congress.

Special botany should hold a still more important place in the programme. It is indispensable, in fact, that all who apply themselves to gardening should be acquainted with botanical terms and descriptions, so as to be able to understand the descriptions of the plants given in the Floras, and to be able on occasion to make a dissection of the flower. The gardener should have as clear an idea as possible of classification. If they understood better what is meant by a natural group, family, genus, species, &c., they would not be so often seen trying to obtain a graft or a hybrid under impossible conditions, nor announce in their catalogues, as among new species, simple forms soon condemned to disappear by returning to the primitive type. It is equally a necessity that the pupils of a school of gardening should receive some information concerning the geographical distribution of plants, and the dispersal of different natural groups on the surface of the globe. The gardener who possesses these facts will be less exposed than others to the risk of failure when he is called on to cultivate newly introduced plants. He will know, on the contrary, how to place them under conditions of existence analogous to those of their native country. The theoretical teaching to be easily understood by the pupils should, as is before said, be based as far as possible on practical instruction. What idea can a young man, having had little preparatory education, form of the cell, the seat of the principal functions of plants if the Professor has not shown it to him under the microscope? This simple examination will ensure a better result than the longest explanations. It is certainly of little use for the future gardener to be instructed in the art of making microscopical preparations for himself; but it is desirable to allow him to see from time to time those made by the Professor. It is especially in special botany that practical work is of use. To this end the Professor should lay before his pupils well selected specimens from the principal natural groups, and proceed to examine them with his pupils. In Belgium the excellent manual by M. Crepin is of great use in this respect, the pupils employing their botanical excursions successfully. These herborisations, in spite of all their advantages, have nevertheless a drawback; this is, they take up time which might be devoted to more useful garden work. When, as is the case at Ghent, a collection of plants exists, and in which the plants are labelled and classified after a natural method, the necessity for a number of excursions is in a great measure done away with. In a botanic garden instruction is made to bear on plants not represented in the native flora of a country, and which the gardener is perhaps especially interested in knowing. It is very important to teach the pupils to dry plants and to preserve them in herbaria. Each should be supplied with a label mentioning, not only the name of the species, but even the spot where it was gathered, the time of its blooming, and the name of the collector.

Editorial Notes.

The barren nature of soil containing much tannin is due to the fact that it precipitates in an insoluble form the constituents which are most necessary for plant life.

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A MAN who has not much experience of garden-work suggests that for laying-out and trenching, which he has lately tried, a cast-iron back with a hinge in it would be an improvement on the spinal column now in use. He is of course an American.

MM. LECHARTIER and Bellamy have submitted cherries, gooseberries, figs, lemons, and chestnuts to fermentation, and find the results similar to those with apples and pears; they consider that life exists in fruit and grain until destroyed by fermentation, and that it is not exhausted until all fermentable matter is converted to alcohol and carbonic acid.

"LUSIADAS" ROSE.—Some of the continental horticultural journals narrate how a Portuguese Nurseryman has offered a new carmine-coloured Rose for sale at a high price. Unfortunately it has been discovered that this splendid new Rose is simply Celine Forestier, which has been suffered to absorb some aniline dye in the same manner that the blooms of the White Lily are occasionally treated.

AT the commencement of the seventeenth century hops began to be cultivated in England. There was much opposition to their use; and some years later the City of London petitioned Parliament "against two nuisances, or offensive commodities, that were likely to come into great use and esteem. These were Newcastle coals, in regard to their stench, and hops, in regard they would spoil the taste of drink and endanger the people."

MOST of us cultivate too many plants; collection rather than selection is our aim; but then the difficulty is to know which to choose where all are beautiful. "My husband always has twice as many plants as he has room for," said a friend to me not long ago. "Ah, ah!" laughed the culprit, "I never can refuse a good thing, and you know we like, at any rate, to keep up with our neighbours." A very common, but nevertheless mistaken, notion is this of keeping abreast of our neighbours by cramming our garden with twice as many plants as it is capable of well containing. Much more praiseworthy is the spirit of rivalry when devoted to the culture of a few really choice plants, and much greater the pleasure they afford than a crowded assemblage of starvelings, however choice they may be.

THE GLOBE ARTICHOKE AS AN ORNAMENTAL PLANT.—Hans Christian Andersen, in one of his pleasing stories, "The Gardener of the Manor," describes how a flower of this Artichoke, placed on a leaf of the Water Lily floating in a large crystal vase astonished the family of the manor by its beauty and rarity. It is true that a revulsion of feeling set in when they discovered that instead of being the sacred Lotus of Hindostan it was only a common flower from the kitchen garden; yet then the admiration in the first instance was genuine. In good, deep soil, with space enough for development, the Globe Artichoke, either as a single specimen, or two or three together, makes an effective background plant, especially at this season when in flower, and one or two of its flowers placed in a vase with plenty of foliage have a striking effect. The foliage of the various forms of Canna seems also to set them off to good advantage, and they are very lasting in water.—E. HOBDAY.

WHAT IS A PLANT?—Mr. Worsley-Benison has been discussing this question in a very interesting way, and he says in conclusion that "*physiologically* the most distinctive feature of plant-life is the power to manufacture protein from less complex bodies; that of animal-life, the absence of such power." He finds that in form, in the presence of starch, of chlorophyl, in power of locomotion, in the presence of circulatory organs, of the body called nitrogen, in the functions of respiration and sensation, there are no diagnostic characters. He finds, however, "fairly constant and well marked distinctions" in the presence of a cellulose coat in the plant-cell, in digestion followed by absorption, and in the power to manufacture protein.

The morphological feature of plants is this cellulose coat; of animals, its absence; the *physiological* peculiarity of plants, this *manufacturing power*; of animals, the want of it. But after all the discussion he says: "To the question, *Is this an animal or a plant?* we must often reply, *We do not know.*"—*The Microscope.*

SEED ADULTERATION.—The Act that was passed a few years ago does not, it appears, suffice to entirely prevent the evil practices of seed-doctors, or probably that fault lies with those who should avail themselves of its provisions and do not. We have before us samples of very old Trifolium seed and other samples of the same seed sulphured and repolished, and intended presumably for mixing with genuine seed. We are informed that as it is requisite to wet the old seed to enable it to take up the sulphur there is an increase of weight of about 20 per cent, which more than pays all the expense of the operation. The value of the old seed, we are informed, is about 4s. the cwt., while the doctored seed sells for 20s. or thereabouts the cwt. We do not know where or by whom this bit of meanness is perpetrated, but are astonished that farmers do not if not taste at least try before they buy. The much derided flower-pot experiments are sufficient to reveal the state of the case, for on trial we find about 23 per cent of failures in the old seed as against 90 per cent of failures in the doctored seed.—*Gardeners' Chronicle.*

THE BEST BAITS FOR INSECT TRAPS.—M. E. C. Carrière has lately been trying a number of experiments on the best baits for insect traps, and gives an interesting account of them in a recent number of the *Revue Horticole.*" The results arrived at effectually disprove the truth of the old saying, that we may catch more flies with a spoonful of honey than with a gallon of vinegar. A number of glass fly traps, filled with different liquids sweet and sour, were placed under some fruit trees which were subject to the attacks of flies and other insects. The traps were baited with honey, weak wine and water, beer and water, vinegar and water, pure beer, pure wine, crushed Pears and water, and other liquids; and the victims were counted, after the traps had been exposed for three weeks, with the following results: The trap containing beer and water stood at the head, and contained 850 flies and other insects; pure beer stood next with 631, the crushed Pears, weak wine, and pure wine coming next, pure honey being at the bottom of the poll, with only 17 sufferers. No doubt the odour of the beer and water, which was in a strong state of fermentation, had a great deal to do with attracting the insects.—C. W. QUIN.

JEWISH FLOWER GARDENS.—There are in the Bible no direct references to the culture of flowers. Indeed it is curious to note that in the usual generic sense of the word there is no Hebrew equivalent for the term "flowers." We should be disposed to say that mere beauty of form in these "gems of the field" appealed less to the Hebrew than fragrance of odour. Not that he was insensible to the beauty of the blossom—in rich colouring and graceful growth; but he was always subjective rather than objective, and thought characteristically enough more of the perfume of a plant than the beauty of its flowers. And aromatic plants he especially seems to have delighted in, as the reader would infer from the number of such referred to in the Bible. Hence the nearest approach to our generic term "flower" is to be found in the Hebrew word "bosem," really signifying fragrant or scented plants as used in the Song of Solomon: "I have gathered my myrrh with my fragrant balsam plant." The translation of the authorised version in this passage is altogether out, for "spice" is ridiculous in such a connection, since spices are not gathered from growing plants in a flower-garden.—*Bible Flowers.*

EUCALYPTI THE TALLEST TREES IN THE WORLD.—The tallest accurately measured Sequoia (Wellingtonia) standing in the

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Calaveras Grove, California, measures 325 ft., and there is no positive evidence that any trees of this genus ever exceeded that height. Of late years, explorations in Gippsland, Victoria, have brought to light some marvellous specimens of Eucalyptus, and the State Surveyor of Forests measured a fallen tree on the banks of the Watts River, and found it to be 435 ft. from the roots to the top of the trunk. The crest of this tree was broken off, but the trunk at the fracture was 9 ft. in circumference, and the height of the tree when growing was estimated to have been more than 500 ft. The tree, however, was dead, though there is no doubt that it was far loftier than the tallest Sequoia. Near Fernshaw, in the Daudenong district, Victoria, there has recently been discovered a specimen of the Almond Leaf Gum (Eucalyptus amygdalina) measuring 380 ft. from the ground to the first branch, and 450 ft. to the topmost twig. This tree would overtop the tallest living Sequoia by 125 ft. Its girth is 80 ft., which is less than that of many Sequoias, but, as far as height is concerned, it must be considered the tallest living tree in the world.—*Scientific American.*

CACTUS HEDGES.—The Cactus makes an admirable hedge, and is easily propagated by cuttings. Snip off a piece and bury its end in the ground, and it will generally grow. Some nervous people, however, object to it for its supposed property of harbouring snakes or vermin, and the authorities, in some places, wage a war of extermination against the useful plant. A sort of Cacticide epidemic raged some years ago in Madras, and a native medical officer won both honourable mention and a tangible reward by divulging to the authorities his discovery that the "Coccus," or Cactus bug, was the natural and appointed destroyer of the Cactus tree, and should be therefore enlisted for its destruction! The suggestion was rapturously received. The labours of gangs of convicts employed in grubbing up and burning the plant were dispensed with, and in lieu thereof a departmental issue of Cactus bugs was at once ordered on the most profuse scale. For months the luckless postal runners groaned beneath the weight of parcels of the Cactus plant, with healthy "cocci" adhering, pieces of which infected plant were to be distributed in spots where the Cactus was plentiful, that the great battle of *Coccus* versus *Cactus* might be fairly fought out. It reads like a scheme disinterred from the archives of the philosphers of Laputa, but was actually conceived and carried out in Madras, and is too curious an example of intellectual idiosyncracy to be passed over in silence by the conscientious historian.—"MASON'S BURMAH."—*Gardeners' Chronicle.*

ANTS.—Some of the performances of ant (remarks the Rev. J. G. Wood, in his recently published work, "Man and Beast,") are absolutely startling, so closely do they resemble the customs of human civilization. They have armies commanded by officers, who issue their orders, insist upon obedience, and, on the march, will not permit any of the privates to stray from the ranks. There are some ants which till the ground, weed it, plant the particular grain on which they feed, cut it when ripe, and store it away in their subterranean granaries. There are ants which are as arrant slaveholders as any people on earth ever were. They make systematic raids on the nests of other ants, carry off the yet unhatched cocoons, and rear them in their own nests to be their own servants. There are ants which bury their dead—a fact which was discovered by accident. A lady had been obliged to kill some ants, the bodies of which lay about the ground. Presently a single ant found its dead companions, examined them, and then went off. Presently it returned with a number of others and proceeded to the dead bodies. Four ants went to each corpse, two lifting it up and the other two following; the main body, some two hundred in number, following behind. The four bearers took their office in turns, one pair relieving the other when they were tired. They went straight to a sandy hillock, and there the bearers put down their burdens, and the others immediately began to big holes. A dead ant was then placed in each grave, and the soil filled in. The most curious part of the proceedings was that some six or seven ants refused to assist in grave-digging, upon which the rest set on them, killed them, dug one large hole, and tumbled them unceremoniously into it.

THE LEAF-EATING ANT.—Mr. A. Nicols, writing to *Nature*, refers to the present treeless condition of the pampas of the La Plata and of the difficulty of establishing trees on those plains. North of Monte Video, for some hundreds of miles, the leaf-eating ant is omnipresent. I have seen streams of them running along the beaten paths to their nests, each ant carrying the yellow petals of some plant similar to the buttercup. When I first noticed, from my horse, this procession of golden leaves, I was greatly astonished. Familiarity, however, soon dispelled this. The *opima spolia* was being carried to their nests and taken underground, no doubt as a provision for the winter. The ants were about a quarter of an inch in length, and of a beautiful steel-blue colour. Those I picked up for examination demonstrated their powers by shearing off the hard cuticle of my thumb or forefinger with their mandibles. Subsequently I made the acquaintance of a gentleman, well known in the Banda Oriental, the owner of the "Estancia Sherendon." He showed me a splendid grove of about two acres of *Eucalypti* of several species—the "blue" and "red" gum chiefly. These he had reared from seed, their enemies being these ants. As soon as the first leaves of his cherished plants appeared, the ants cut them off He then got a drum of gas-tar sent up from town, and made a circle round each plant. The ants objected to this, and all the trees made a start. For three years in succession he carefully painted the stems with tar, and eventually they got so far away as to be able to supply the wants of their foes and still flourish. When I saw these trees they bore finer foliage than I ever met with in the Australian Bush during four years' experience. They were then eight years old. Many were forty feet high, and thirty-six inches round at some three feet from the earth.

Original Articles.

THE ROSE.

AMERICAN ROSES.

It is not perhaps generally known that large number of varieties of Roses have originated in America; some of these are to be found in our gardens, but having been imported from England, their original birth-place has not been revealed. The following list compiled by the celebrated American Rosarian Mr. H. B. Ellwanger, contains much interesting information :—

A Monograph of Roses which are of American origin has, I believe, never before been attempted; not, perhaps, because there has been a want of interest in the subject, but because of the inherent difficulty in procuring reliable data. To discover the parentage of the various varieties, and the names of the raisers, has been an arduous undertaking, and I regret not being able to present a complete record; this, however, was hardly to be expected. Two classes have had their origin in America, the Prairie and Noisette Roses. These two classes give the most valuable climbers which we have, though our Transatlantic brethren do not take very kindly to the former. Besides these two classes, many varieties in other groups have had their origin in this country, several of which are leading sorts in all Rose catalogues of prominence, but our chief contributions must be considered the Prairie and Noisette varieties, as introducing new and very important groups.

The Prairie Rose (Rosa rubifolia) is indigenous to this country. Seeds of this were sown about 1836 by Messrs. Samuel & John Feast, of Baltimore. The seedlings from this sowing were then fertilised by some of the best Roses grown at the time, and from this lot came Baltimore Belle and Queen of the Prairies. The Messrs. Feast, together with Joshua Pierce, of Washington, have raised nearly all the varieties of this class possessing any merit. Though inferior in quality to the Tea Noisettes, their hardiness and vigorous habit make them of great value when the more beautiful Noisettes are too tender to be made useful. As an indication of their popularity we may state that, next to the Remontant Roses, H. P., more plants are annually sold of the Prairie than of any other class. Baltimore Belle when in blossom gives

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a display of which any one may be proud, whether the flowers are viewed individually or in the mass. It is much to be regretted that no further development of this really valuable class has been made. There is no reason why we should not succeed in obtaining a new class of hardy climbers which shall, in a great measure, combine the good qualities of the Hybrid Perpetual, Noisette, and Prairie Roses. By patient study and care this may be done. Who is there that will do it? To accomplish this desired result the Prairie varieties might be made the seed parents, and fertilised by different varieties of Remontant and Noisette Roses known to be good seed-bearers and that are otherwise desirable sorts.

A few years ago Mr. Henry Bennett, of Salisbury, England, commenced a series of experiments in the production of new Roses by artificial fecundation; selecting a number of sorts among the Tea and Hybrid Perpetual groups, and seeking, as far as possible, to combine and blend the several good qualities possessed by each. He has in this way founded a new, and what will certainly prove to be a very valuable class of Roses—the Hybrid Teas. Indeed it is my opinion that this group of Hybrid Teas will, by the improvements which are certain to be made, soon constitute our most popular class of Roses. What has been accomplished by Mr. Bennett is very good evidence, to my mind, of what can be done by us, in producing a class of hardy H. P. Climbing Roses.

In the list of American Roses there are several varieties with which I am unacquainted, and the descriptions, therefore, are those of the raisers, or, where in a few instances it was not possible to obtain these, they are described by reliable parties acquainted with the varieties. Whenever possible, both the name of the raiser, and the year when the variety was first sent out, are given.

Prairie Roses (*Rosa rubifolia.*)

These possess great vigour of growth, bloom late in the season in large clusters, and though the individual flowers lack many of the desirable features found in other classes, none are more effective in the mass. Anna Maria (raised by Samuel Feast, of Baltimore, Md., 1843), colour blush or pale pink, full flowers; has very few thorns. Anna Eliza (Williams), dark purplish-red. Baltimore Belle (Samuel J. Feast, 1843), white, with blush centre, of good full form. This seems to have some Noisette blood, which makes it a little tender in very severe winters; it is, however, the most beautiful and sought-after of the class. Eva Corinne, pale blush. Gem of the Prairies (raised by Adolphus Burgess, of East New York, 1865), a hybrid between Queen of the Prairies and Madame Laffay (Remontant); rosy-crimson, occasionally blotched with white. Jane, rosy-blush, double and finely shaped. King of the Prairies (Samuel Feast, 1843), pale rose. Gracilis (W. Prince, 1845), rose, varying in hue. Lineæan Hill Beauty, white or pale blush. Madame Caradori Allan (S. Feast, 1843), bright pink, semi-double. Milledgeville, pale blush, tinged with flesh. Miss Gunnell, pale pink. Mrs. Hovey (Joshua Pierce, of Washington), pale blush flowers, becoming almost white; resembles Baltimore Belle, but of rather hardier habit. Mrs. Pierce (J. Pierce, 1850), blush. Pallida (S. Feast, 1843), blush, much resembling Superba. Perpetual Pink (S. Feast, 1843), rosy-purple. Pride of Washington, deep rose; small flowers, but distinct and double. Queen of the Prairies (S. Feast, 1843), bright rosy-red, frequently with white stripe; foliage large and quite deeply serrated. Ranunculiflora, small, blush flowers. Superba (S. Feast, 1843), pale rose, changing to blush. Triumphant (J. Pierce, 1850), deep rose, double and compact. There have been a few other varieties in commerce, but the above constitute those which have most commonly been grown, and are the only ones now propagated. The most valuable are—Anna Maria, Baltimore Belle, Gem of Prairies, Mrs. Hovey, Queen of Prairies, and Triumphant.

Noisette or Champney Roses.

Rosa Noisettiana, or Rosa Champneyana, or Rosa moschata hybrida. The Noisette Rose is a product of America, and obtains its name from Philippe Noisette, a florist of Charleston, South Carolina. John Champney, of Charleston, from the seeds of the White Musk Rose, fertilised by the Blush China, raised a variety which was called Champney's Pink Cluster. A few years after this, Philippe Noisette, from the seed of Champney's Pink Cluster raised the Blush Noisette, and this he sent to his brother, Louis Noisette, of Paris, under the name of Noisette Rose. The true name, therefore, for this class should be the Champney, but the change cannot now be made. This group is naturally of vigorous growth, nearly hardy, and produces large clusters of flowers; but, through hybridisation with the Tea section, the original characteristics have in part disappeared.

The varieties now generally grown are less hardy, and have nearly lost the clustering tendency; but the flowers have much more substance, and are far more beautiful. America (Prof. C. G. Page of Washington, D. C.; sent out by Thomas G. Ward, 1859); growth vigorous; flowers large, creamy-yellow, with a salmon tinge; a cross from Solfaterre and Safrano. Beauty of Greenmount (James Pentland, of Baltimore, 1854), rosy-red. Champney's Pink Cluster (John Champney), very vigorous; flowers pink, semi-double. Cinderella (C. G. Page, 1859), rosy-crimson. Dr. Kane (Pentland, 1856), growth free; flowers large, sulphur-yellow; a shy bloomer on young plants; in the South it is highly esteemed. Isabella Gray (Andrew Gray, of Charleston, South Carolina, 1854), growth free; flowers large, golden-yellow, full and fragrant; on young plants it does not flower fully, and often opens badly; a seedling from Cloth of Gold. Nasalina (A. Cook, 1872), "of vigorous growth; flowers pink, of flat form, very fragrant; a seedling from Desprez." Tuseneltea (Anthony Cook, of Baltimore, 1860), "pale yellow; a seedling from Solfaterre." Woodland Marguerite (J. Pentland, 1859), growth vigorous; flowers pure white, freely produced. There have been other American varieties of this class, but I am only certain of those above named. We hope our southern rosarians will introduce some new types and colours of Noisettes; almost the only ones of value we now have are shades of yellow and white. In the South many Noisettes seed freely, and great improvements might easily be made by resorting to manual fecundation. I see nothing to prevent the obtaining of the same shades among the Noisettes that we have among the Hybrid Perpetuals.

Bourbon Roses.

Charles Getz (A. Cook, 1871), a hybrid; "growth very vigorous, making a good climber; quite hardy; colour deep pink; very fragrant." George Peabody (J. Pentland, 1857), growth moderate, colour purplish-crimson; a probable seedling from Paul Joseph. Oplitz (A. Cook, 1871), "a hybrid; growth moderate, colour fiery red; a seedling from Gloirie des Rosomenes." Renno (A. Cook, 1868), named after General Renno, of Philadelphia; colour deep pink. Setina (Peter Henderson, 1859), identical with Hermosa, from which it is a sport, except that it is of stronger growth.

Bengal Rose.

James Sprunt (Rev. James M Sprunt, 1856), sent out by Peter Henderson, 1870; like Cramoisie Superieur, but of vigorous growth, making an excellent climbing sort.

Hybrid Perpetual Roses.

Belle Americaine (Daniel Boll, of New York), deep pink colour; flowers small, but of fine form. Madame Boll (Daniel Boll), sent out by M. Boyeau of Angers, France, in 1859; growth vigorous; foliage very large and handsome, of a pale green colour; spines numerous; flowers large or very large, form flat, colour carmine-rose; a free autumnal bloomer and very hardy—perhaps the most hardy in the class. One of the most superb Roses for the garden. Madame Trudeau (Daniel Boll, 1850), deep rose, double and well formed. Charles Cook (A. Cook, 1871), scarlet-crimson. Contina (A. Cook, 1871), rosy-pink. Il Defense (A. Cook, 1871), shining red, Camellia form, thornless. La Brilliante (A. Cook, 1872), brilliant red; raised from Napoleon III. Rosalina (A. Cook, 1871), rose colour. Souvenir de President Lincoln (A. Cook, 1869), dark velvety crimson. These are the only varieties I can name of American origin, though others have been raised. M. Boll, now deceased, who was by birth a Swiss, produced a number of seedling Hybrid Perpetuals of merit; several of these were sold to parties in France, who sent them out as their own. Among these was Madame Boll. It would be interesting to know, whether any among them besides Madame Boll are now famous.

Tea Roses.

American Banner (George Cartwright, of Dedham, Mass., 1877), sent out by Peter Henderson in 1878; a sport from Bon Silene; growth moderate, foliage quite small and leathery; flowers carmine, striped with white. The form and fragrance of the flowers seem the same as in the old variety, but in habit they are entirely distinct. It will perhaps be popular as a novelty, but it has no

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intrinsic merit to make it valuable, and we cannot commend it. Carolino Cook (Anthony Cook, 1871), colour pink; a seedling from Safrano. Cornelia Cook (A. Cook, 1855), growth moderate, flowers white tinged with flesh, large and very full; not a free bloomer, and often does not open well, but a superb Rose when well grown; a seedling from Devoniensis. Desantres (A. Cook, 1855), "colour flesh, very distinct from any other Tea Rose; a better bloomer than Cornelia Cook, and a good winter flower. Raised from Devoniensis." General Washington (C. G. Page, 1860), rosy-crimson. Isabella Sprunt (Rev. James M. Sprunt, 1855), sent out by Isaac Buchanan, of New York, in 1865; sulphur-yellow, a sport from Safrano, which variety it very closely resembles in all save colour of the flower. Paradine (A. Cook, 1858), canary-yellow, small flowers; a seedling from Le Pactole. President (sent out by Mr. W. Paul, of London, in 1860), growth moderate; colour rose, with salmon shade; flowers large, moderately full, much resembling Adam. Mr. Paul, the disseminator, states that this is an American variety, but I am unable to learn by whom it was originated.

ELECTRIC PLANTS.

All of us are more or less aware of the great difficulties that attend the successful management of a first class daily journal, for no matter at what season of the year, a certain space has to be filled with subjects that are likely to interest its readers, and many amusing anecdotes are told of the various ways in which this is done. In England the monster gooseberries that appeared so regularly season after season for nearly half a century, are certainly not heard of so frequently as of yore, for they have had to give place to the gigantic potato, a fashion originally started by Mr. Gladstone, who at his rent audit at Hawarden in 1879 or 1880, in preaching his annual moralising sermon to the tenants, exhibited a monster tuber weighing 25½ ounces as a specimen of what could be accomplished by good culture. This was of course sufficient to fire the enthusiasm of his radical admirers, and now year by year, in all parts of the county, the weights of other monsters are annually recorded, and no doubt, amongst a certain class of readers, these records are watched with as great a degree of interest, and every quarter of an ounce added to the previous score causes as much enthusiasm as is felt amongst our American cousins as year by year their celebrated trotters beat the previous "best on record." In the vegetable kingdom also our cousins score some very big records: for years, in the dull season, the mammoth trees of California were annually measured (in imagination generally) and a few inches, or perhaps feet, added to their height. The Australians, however, came along with their Gum trees (Eucalypti) and took the wind out of their sails by at once adding more than a hundred feet to the "best on record." This was too much for "Brother Jonathan," and he at once succumbed. The rage with him at present is for mammoth pumpkins and enormous tomatoes; the former have a record of something over one hundred and seventy pounds, and Tomatoes are now grown from one and-a-half to two and-a-half pounds each, at least we are told so While journalists content themselves with improving the records of certain plants, either fruits or vegetables, that we are all familiar with little harm can be done, but what is to be said to the man who for the edification of his readers introduces not merely a distinct species, but an entirely new genera of plants. It appears that this wonderful feat has been accomplished by an Indian journalist, that is, if we can believe the following confession which appeared in a recent issue of the *Indian Daily News*:—"It is sometimes amusing to notice how "news" goes the round of the papers. A curious case in point has lately come under our notice. Some months since a member of our staff wrote an imaginary account, supposed to have been quoted from an Australian paper—we must beg the Australian papers generally to forgive the imposture—which purported to describe the discovery, by some German explorers in New Guinea, of a marvellous electric plant. It is not, of course, the first time such a hoax has been played off upon the public; but it seems to have been about the most successful attempt, though the very names given to the explorers—"Lieutenant Immen Gosende, of the German Navy, and Dr. Kummel"—ought to have been sufficient to arouse suspicion of a "sell." The article was, however, largely quoted by the Indian Press, some papers taking the precaution of remarking, *en parenthèse*, that the account did great credit to Lieutenant Kummel's ingenuity and imagination. It also travelled to China, and was quoted with a surprised interest in Shanghai and Hongkong. Whether it reached Australia and America also, we are not aware; but it probably did, and we should not be greatly surprised to see some notice of the remarkable discovery yet appear in the *Times*. As we said before, it is some months since we published the original account, and since the greater number of the Indian papers noticed it; but we find the following grave paragraph in the *Pioneer* of only two days ago:—

An Electric Tree.—Lieutenant Immen Gosende, of the German Navy, and Dr. Kummel are exploring North-East New Guinea. They report, says an Australian paper, that they have reached a point one day's march from the coast, and discovered that their compass was useless owing to the presence of a tree which possesses the properties of a highly charged electric battery. Dr. Kummel was knocked down when he touched it. An analysis showed the tree to be almost pure amorphous carbon. It has been named "Elsassia Electrica."

He have noticed on one or two occasions lately attempts made in the *Pioneer* to lay down the law on somewhat abstruse questions of chemical analysis. Our contemporary's special chemist is hardly, we suppose, responsible for the choice of this delicious extract. At any rate, we may congratulate the *Pioneer* on the enterprise which obtains news originating in Calcutta after it has been a voyage to China and elsewhere, and on the judgment shown in its selection of interesting and instructive items of information."

Alitur vitium vivitque tegendo! In all probability we should never have heard of this pretty little secret of journalism had it not been that another big dog came along and took a morsel from the bone that was stolen.

As our contemporary appears to have been the original introducer of the wonderful Electric plant *Elsassia Electrica*, it is only natural that he should be anxious to hear what the world says regarding his progeny. We are unable to say whether it has yet reached America or Australia, but we can assure him of its safe arrival in England, where it met with a warm reception. The *Gardeners' Chronicle* of December 5th, in reply to an enquiry from a correspondent regarding the Electric tree of New Guinea, says, "*Elsassia Electrica* belongs to the Bosh or Fudge family. It has many synonyms, such as *Feleetes apatelos mendacium impudens*, *Fallacia fugosa*, not to mention vernacular names."

Our contemporary describes his original article on this subject as an "*imaginary account*" of the discovery of this marvellous plant. It would be interesting to know to what degree the imagination extended, and whether this "member of the staff" claims to be the original discoverer of electricity in plants, or rather of an electric plant, or only of the species in question. If the former is the case, there are certainly other claimants for the honour, and their claims deserve consideration.

The first record of an electric plant that can be considered in any way authentic, appeared about the end of 1884 in a German publication styled the *Hamburgh Garten und Blumen Zeitung*, where Professor Levi describes a plant which he says "emits electric shocks when touched or when the branches are torn off. It is also said to affect the magnetic needle at some paces off. The plant is called *Phytolacca Electrica*," (this paragraph appeared in the *Indian Gardener* on February 3rd, 1885). The *Gardeners' Magazine* also of June 20, 1885, in an article on "Interesting Vegetable Forms," minutely describes the same plant, (this will be found in another column). It is a pity that our contemporary does not state on what date this "*original imaginary account*" appeared in print. If it was prior to the dates above given, we can only bow in respectful admiration at this wonderful display of genius. If, on the contrary, it appeared subsequent to them,—well the less said the better. But we may venture to hope that the next time he adopts an infant, although he may dress it in any guise that may suit his fervid imagination, he will at least allow its original name to remain intact. Botanical names are already sufficiently numerous and difficult enough, without having other meaningless ones added to their number.

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CALCUTTA FLOWER SHOW, 1886.

Schedule of Prizes awarded at the Annual Show, held in the Gardens at Alipore of the Agricultural and Horticultural Society of India, on Wednesday, the 10th of February 1886.

PRIZE LIST.

No. of Class.	Class.	First Prize.	Second Prize.
	Growing Plants.		
1	For the best collection of Plants and or Flowers of any number of kinds.—**The Grant Silver Medal**	Baboo J. C. Biswas.	
2	Camellias, not less than 6 plants, in Flower, ...	Mrs. Apcar.	
3	Do. do. 3 do.	Ditto.	
4	Orchids, do. 3 dissimilar kinds, in Flower, ...	Ditto.	
5	Do. do. 2 do. do.	No award.	
6	For the best specimen Orchid, ...	Mrs. Apcar	Baboo J. C. Biswas.
7	Roses, not less than 12 dissimilar kinds, in Flower, ...	Belvedere	Maharajah of Cooch Behar.
8	Do. do. 6 do. do.	Ditto	Eden Gardens.
9	For the best specimen Rose, ...		
10	Ferns, not less than 12 dissimilar kinds, ...	Mrs. Apcar	No award.
11	Do. do. 6 do.	Maharajah of Cooch Behar ...	Mrs. Apcar.
12	For the best specimen Fern, ...	Mrs. Apcar	Eden Gardens.
13	Begonias, not less than 12 dissimilar kinds, ...	Ditto	Maharajah of Cooch Behar.
14	Do. do. 6 do.	Ditto	Mr. H. A. Eskine.
15	Panax and or Aralias 10 do.	No award.	
16	Do. do. 5 do.	Baboo J. C. Biswas ...	Eden Gardens.
17	Draccenas do. 12 do.	Belvedere	Baboo J. C. Biswas.
18	Do. do. 6 do.	Eden Gardens	Eden Gardens.
19	Dieffenbachias, do. 6 do.	Baboo J. C. Biswas ...	No award.
20	Do. do. 3 do.	P. C. Banerjee ...	J. C. Biswas.
21	Crotons, do. 24 do. well grown.	Maharajah of Cooch Behar ...	Eden Gardens.
22	Do. do. 12 do do.	Baboo J. C. Biswas ...	Eden Gardens.
23	Do. do. 12 do. new & rare varieties	Mr. G. Bartlett	No award.
24	Do. do. 6 do.	No award.	
25	Coleus, ... 15 dissimilar kinds	Maharajah of Cooch Behar ...	Belvedere.
26	Do. ... 8 do.	Belvedere	Maharajah of Cooch Behar.
27	Verbenas, ... 6 do. in Flower, ...	Eden Gardens	Eden Gardens.
28	Asters, ... 6 do. do.	Eden Gardens	Eden Gardens.
29	Pansies, ... 6 do. do.	Eden Gardens	Belvedere.
30	Phloxes, ... 6 do. do.	Belvedere	Eden Gardens.
31	Petunias ... 6 do. do.	Eden Gardens	Eden Gardens.
32	Portulacas, ... 6 do. do.	Belvedere	Eden Gardens.
33	Geraniums, ... 3 do. do.	Eden Gardens	Belvedere.
34	Nasturtiums, ... 6 do. do.	No award.	
35	Violets, ... 12 pots do.	Belvedere	Maharajah of Cooch Behar.
36	Heliotrope, ...		
37	Foliage Plants, 20 dissimilar kinds, ...	Maharajah of Cooch Behar ...	Belvedere.
38	Do. ... 10 do.	No award.	
39	Rare Plants, not before exhibited, not less than 8 dissimilar kinds, ...	No award.	
40	Scented foliage plants, ...	Eden Gardens	Mrs. Hill.
41	A collection of not more than 20 or less than 15 pots of dissimilar kinds of annuals, or any bulbous or herbaceous plants in blossom	Belvedere	Eden Gardens.
	Cut Flowers.		
42	Camellias, stand of not less than 6 Flowers, ...	Mrs. Apcar.	
43	Do. do. do. 4 do.	Mrs. Apcar.	
44	Roses do. do. 24 dissimilar kinds,... ...	Mrs. Pryce	Barrackpore Park.
45	Do. do. do. 12 do.		
46	Do. do. do. 6 do.		
47	Do. for the best single specimen, ...	P. C. Banerjee	Mrs. Pryce.
48	Bridal Bouquet, of White Flowers, ...	Barrackpore Park ...	Mrs. Apcar.
49	Hand Bouquet, for Ball Room, ...	Mrs. Elson	P. C. Banerjee.

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PLANTS FOR TABLE ORNAMENT.

In offering a few remarks on plants suitable for table decoration, I shall confine myself to such as may be grown on to a useful size in 48 pots. Although, for some occasions, plants in larger pots may be used; yet, for general purposes, any thing larger than a 48 is not admisable. In growing plants for market purposes we find this a very essential point. Palms are perhaps the most useful of all the green foliaged plants; we will, therefore, give them the first place. In making a selection, as many of the hardier sorts should be included as possible, as these can be used without fear of being damaged, where many of the tender sorts would be destroyed.

Kentia Fosteriana.—This is certainly one of the very best Palms for table decoration, it is of very graceful habit, and will succeed well in an intermediate temperature. K. Belmoreana and K. Wendlandiana, are also very useful.

Cocos Weddelliana.—This elegant Palm is a general favourite, being particularly adapted for the centre of an epergne; if plants of a suitable size are used for this purpose they show off to great advantage. It requires stove treatment, and is rather delicate; if over potted or given too much water it will soon get into a sickly condition.

Geonoma gracilis.—This is another slender-growing species, somewhat resembling the above, the leaves are more recurved, however, and it is particularly graceful in a small state.

Phœnix rupicola.—In habit this somewhat resembles the older and better known species P. reclinata, it is, however, of much more graceful appearance, the leaves being more elongated, and the pinnæ narrower.

Seaforthia elegans.—This is especially valuable on account of its free-growing habit; it attains to a large size much quicker than most of the Palms, and for purposes where a large plant in a small pot is required it will be found very useful, and as the seed is inexpensive and germinates freely, it is brought within the reach of those who have not the convenience to grow the more delicate sorts.

Areca lutescens.—This is a very graceful Palm, the pale yellow leaf-stalks giving it a very light appearance; plants that have been hardened off will stand well, but it is best to avoid using them while they are developing young leaves.

Areca Herbstii is a very handsome plant, the leaves which are of a pale glaucous green are beautifully recurved, and the leaf-stalks are covered with long sharp spines.

Rhapis flabelliformis.—This is very distinct, and being of a hardy nature it will stand more exposure than most Palms.

Corypha australis.—This is very valuable on account of its hardy nature. In growing young plants on, however, they should have stove treatment, as under such treatment the leaf-stalks become more elongated, and the plant altogether assumes a lighter and more graceful habit. After they have attained sufficient size for use they may be hardened off, and will do much service either for table or other decoration in exposed positions without being damaged.

Chamærops humilis.—In a young state, this somewhat resembles the above, except that it has no spines on the leaf-stalks; it is also equally hardy, and may be grown under the same treatment.

Latania borbonica.—This is another very serviceable Palm. Plants grown in a high temperature, and kept well shaded during the summer, assume quite a different habit than when grown in a lower temperature and more exposed; it is very effective under either mode of treatment.

Dæmonorops palembanicus is another beautiful Palm; the young leaves are of a bronzy brown, forming a nice contrast to the dark green of its older leaves; it is a stove species.

Many more Palms might be added to the list of useful table plants, but the above will be found sufficient for all ordinary purposes. In the general treatment of Palms it should be remembered that although they like plenty of atmospheric moisture, they should not be over watered at the roots. An occasional watering with liquid manure made from cow-dung and soot will give the foliage a dark green and healthy appearance; or where the pots are well filled with roots, a sprinkle of artificial manure may be given, in which case, either Clay's fertilizer or Standen's manure will be found very beneficial.

Pandanus Javanicus variegatus and P. Veitchii are both very useful subjects for table decoration, and make much more graceful plants if they are propagated from small offsets. The best position to grow them is on a shelf in the stove, as if kept close to the glass and fully exposed to the sun, the variegation becomes much brighter than where they are grown in a shady position; they should be kept moderately dry. If grown on too vigorously they soon lose that graceful habit which is so essential in a table plant.

Pandanus graminifolius.—This, when well grown, makes a very light and graceful plant; and as it is of slow growth, plants that have attained a useful size will do much service before getting too large for the purpose.

Jacaranda mimosæfolia.—This is an exceedingly light and graceful plant, although it is not often met with in good condition. It well deserves attention, as when well grown it makes a very handsome plant. It should be grown in the stove, and succeeds best in light peaty soil.

Aralias.—These include some of the most elegant plants that can be found for the purpose. A. Veitchii, A. Veitchii gracillima, and A. elegantissima, are especially beautiful. A. leptophylla is also a useful species; and to keep up a supply of plants of a suitable size, it is necessary to propagate annually. The three first named sorts can only be propagated by grafting, and the best stock to use is A. reticulata. This is easily propagated from cuttings; and if the tops are saved when the plants are used for grafting, they will always give a successive supply of young plants. The grafts may be obtained by cutting down any plants that have become too leafy. One good plant will give a number of grafts; the stem may be cut up into short lengths, say two eyes to each graft, or where it is required to make the most of the stock, they may be cut up into single eyes. In putting on the grafts they should be kept as close to the root of the stock as possible. The spring is perhaps the best time for grafting, though it may be done at any season of the year, provided the stocks are in a good condition. A. leptophylla may be propagated from cuttings; or, if good established stocks are at hand, plants may be obtained in less time by grafting.

Dracænas.—This valuable genus includes a great variety of useful plants, which are specially adapted for table ornamentation. D. terminalis is probably the most popular of the coloured-leaved varieties; it is of free growth, and generally colours well, the bright red leaves being very effective. D. Cooperi: This is rather more delicate than the above, but when well grown it surpasses it in beauty, the leaves being beautifully recurved gives it a very graceful appearance. There are many other beautiful coloured-leaved varieties which are very useful for the purpose, but the above named still remains the most popular for general use. Of the green-leaved sorts D. congesta is a useful species; D. rubra is also a popular plant; the sort usually met with under this name in market nurseries is somewhat different to the normal form. I do not know if it is a variety, or whether it is a distinct species, but it is certainly a much more useful plant.—A. Hemsley, in *Gardening World*.

SOIL FOR FERNS.

The best plant growers and writers on plant culture recommend peat and loam and leaf-mould, and for some species peat or leaf-mould only, as a compost for Ferns, and most cultivators use these materials in different proportions; but, if anything, a preference is given to the peat.

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One well-known writer on Fern culture states "the soil required for all Ferns is somewhat similar," and he recommends peat and loam, in equal quantities, to be used by those who have limited space at their disposal, and who do not want over-luxuriant plants, while peat and leaf-mould are chiefly recommended for the production of large and vigorous plants —a kind of advice which, according to a writer in the *Field*, does not coincide with his experience. Though we have in the main adhered to the common practice ourselves, still we have had doubts about the advantages of peat used to the extent that it is in Fern culture generally, and we have all but come to think that good light fibry loam would be the best staple for most species, rendered light or otherwise, as need be, by the addition of good leaf-mould and sand. Peat is valuable for many purposes; not to be compared with either loam or leaf-mould, which are both more likely to be found in the habitats of Ferns generally than peat. Be that as it may, we have on several occasions been struck with the extraordinary vigour of plants grown without peat, but chiefly in the case of that handsome species, Adiantum Farleyense. Some time ago we saw a number of plants growing in a compost of strong yellow loam, to which had been added a little leaf-mould. For size of frond and general development we have never seen their equal. We bought two of the plants, and they are now in the stove, and growing alongside other plants of the same variety potted in peat and loam, but mostly peat, and anybody might take them to be two quite distinct sorts. Our own plants are dense and neat enough in habit, and look as A. Farleyense usually does with its semi-drooping fronds; but those in the loam are taller than A. trapeziforme, and nearly as erect in the fronds, the leaflets of which are also large and proportionate. A. Farleyense we have heard condemned as a table plant, because of its low habit; but the two plants in question are all that could be desired for such a purpose—they are matchless, in fact, according to our way of thinking. Having the plants small or large may be a matter of taste; but, as showing the effects of different soils, the example is instructive. We should state that liquid-manure has also been given to the plants; but they were strong before they received any. Nor are there any reasons for supposing that the generality of stove, greenhouse, and hardy Ferns would not be benefited by similar treatment. There are none that we know of, and, though we have used loam liberally for almost all varieties, we shall use it more in future.

To judge of the habits and wants of Ferns generally, we would require to know under what condition each species is found growing in its native country; but such information is not always available. We have been assured, however, by one who has spent thirty years in Australia and Tasmania, and who has collected both seeds and plants in nearly every settled district in these countries, that he never found any plants, Ferns or others, growing in peat, and that he never even saw peat in all his travels throughout Australia. These facts he gave us while looking at his old acquaintances in our hothouses, and he afterwards showed us numbers of plants for which peat is recommended by cultivators in this country, that he had himself raised from seed in common soil from out of his vegetable garden, only sifted to free it from stones. We need not, however, go further than our own woods and fields to learn a lesson in Fern culture. Peat composts are recommended for hardy as well as exotic Ferns; but how do we find these situated under natural conditions? For our own part we have found very many of our native species growing under different conditions as regards soil, but we have found few growing in peat through preference, except the mountain Fern Allosorus crispus, and a few others which we have seen growing on the hills in Scotland. The common Brake is also sometimes found growing in a half-peaty soil, but oftener in loam, in which it attains its greatest size. All the other and shade-loving kinds, except such as prefer to grow on walls and rocks, like the Asplenium Ruta-muraria and others, seem to delight in a good strong soil, enriched on its surface by the leaves which fall annually from the trees—some preferring a moist and some a dry bottom, but always growing with the utmost vigour. The Royal Fern (Osmunda regalis), for which the author before referred to recommends a spongy peat, grows and flowers luxuriantly in a dry loam, but grows the tallest perhaps when it is moist, as we have seen it in the Isle of Man and elsewhere, but not in peat. As with our native Ferns, so also with exotic kinds, probably our strong-growing and shade-loving stove and greenhouse species are found growing for the most part in the rich surface-desposit of the woods with a stratum of loam below, conditions which should be imitated as far as possible in artificial culture. It is not going too far to state, perhaps, that our old practice in regard to composts is founded upon rather arbitrary rules. It might be worth while, for example, to inquire whether it is necessary to use so much peat for some subjects, and so much loam for others, and whether it would not be better in many cases to dispense with either the one or the other altogether. Take the Daphne, for instance, for which peat principally has been recommended, particularly in the case of the delightfully fragrant D. Indica, which we have seen growing and flowering in perfection in an almost pure, red loam. For most of the New Holland plants, such as the Acacia and the Epacris, peat and loam, or peat alone, is recommended; but on what authority? Our Australian friend, before mentioned, says he never saw them growing in peat, but complains of the inroads made upon his garden ground by the roots of his Acacia hedges. Peat of a healthy kind is a good root-producer, and a preserver of the roots in some respects, but it is not so nourishing as leaf-mould. The use of either for mixing in composts of which the staple requires to be loam should always be regulated by the character of the latter. Some heavy loams require lightening considerably with peat or leaf-mould, or both, but neither will compensate for the want of sand, which is in itself almost sufficient to reduce the most tenacious loam to an open, friable state, such as it needs to be for potting purposes, and for loam-loving plants it is better to use it for this purpose than too much of the peat. Light loams, on the other hand, want little or no additions, especially if they be open and fibry; and they are excellent for Pelargoniums, Fuchsias, and many greenhouse or stove plants which delight in a soil of a naturally open and healthy texture.—*The Garden.*

LONDON OFFICE.

OF

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Correspondence.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to, should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication, unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

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Extracts.

DO PLANTS VARY WHEN PROPAGATED BY CUTTINGS?

By Peter Henderson.

On reading what is said about "seed" potatoes in last week's "*Press*," I notice the assertion is made that "seed" taken from the most productive hills gave a larger yield of tubers than that taken from the least productive. I am inclined to believe that further experiments will show that this increased productiveness will not continue to hold; because the reason for the greater or less yield was probably only an accident of circumstances, especially favourable conditions of the set made to form the hill, or by being highly fertilized, or some such cause that gave it this temporary advantage; and that the chances are all against any permanent improvement being made by such selections.

The potato is said to have been introduced into Europe in 1584. If the original tubers had had the highest cultivation that the skill of man could give, it is exceedingly doubtful if 300 years of culture would have changed them in the slightest degree if propagation had been solely from the tubers and not from seed proper.

I base this opinion on a very extended experience in the cultivation of plants from cuttings. Strawberry plants taken from any well known kind, such as Sharpless, for example, from strong, vigorous growing plants, will certainly give better results than from weak plants of the same kind, planted in the same soil. But if the progeny of the strong and the weak plants are again taken and replanted, the difference between the two would hardly be perceptible after they had been growing together under the same conditions. Every now and then we hear of varieties of fruits or flowers, said to be degenerating, that are propagated from cuttings, grafts, or roots. I believe there is no such thing as permanent degeneration of any fruit, flower, or vegetable that is raised from cuttings, grafts, or roots. The Jargonelle pear, the Ribston pippin apple, the Hamburg grape, or the Kean's seedling strawberry of the English gardens are found to look just as good, and as bad under different conditions of culture as they were fifty or one hundred years ago, and that any change, either better or worse, is only an accident of circumstances, and temporary. For be it remembered that when a plant is raised from cuttings, as in the grape vine, grafts as in a pear, or layers as in a strawberry, or pieces of the root as in a potato, such parts are not seed proper, but are merely parts of the same individual first called into existence. The Early Rose potato introduced nearly a quarter of a century ago, is just as good to-day under proper cultivation, as when first introduced, but is certainly no better. It is often to be found of course, under unfavourable circumstances, and then may be supposed to have been degenerated: but when it is shown under other circumstances to be as fine as when first introduced, how can the assertion of permanent degeneracy be admitted.

Permanent improvement, in my opinion, in varieties can only be made by the selection of the fittest specimens that have been raised from seed proper. Here we have, as in the Early Rose potato, the Sharpless strawberry, and the concord grape, varieties that have shot ahead of their fellows having merits that the general public recognise, but all the art of man cannot further improve these, so that their "progeny" (to use a convenient, though not perhaps a strictly correct term) will be permanently better or worse than when first called into existence. It is a very common error, when a luxuriant crop of anything is seen growing under specially good culture, to imagine that cuttings, roots, or seeds from such plants must necessarily give similar results when the same conditions to grow such crops well are not present. Not long ago Boston was famed for its rosebuds, and even experienced florists paid double price for stock from such plants, only to find, that in their hands, these plants would not produce Boston rosebuds. Now the case is changed. Madison, N. J., as a whole, beats Boston in rose culture, and the demand has changed from Boston to Madison, and of course with the same results; for if the purchasers of Madison roses cannot give Madison culture, there will be no Madison rosebuds. While we admit the advantage of a healthy stock, and even perhaps the value of a change of stock, what I claim is that no culture will permanently change the variety from the normal condition, and that the only advance that can be made is by selecting the best specimens, hybridizing these from their seed, again selecting, and so forward.

To be sure we have in rare instances what are known as "sports" by gardeners, or what Darwin has called "bud variation," which may be improvements on the original variety or the reverse; but culture, good or bad, has nothing to do with such anomalous cases.

Again and again we see it asserted as matter for wonder that the wild celery of English marshes, or the wild carrot of the hedge rows, have attained their present high condition by "cultivation." If cultivation means that man has through generations "selected the fittest" of these again and again, taking always the flower of the flock, so as to have attained the present perfection, then that is true; but if by "cultivation" is meant that "domestication" by high culture, manuring, &c., in a garden or a field has caused such results, then in my humble opinion it is not true.—*Phila. Press.*

NEW YORK'S CHRYSANTHEMUM SHOWS.

The intensity of the Chrysanthemum craze in New York has been so great that it seems hardly possible that it can be of long duration, and yet has already continued and increased for three years. The great strength of the Chrysanthemum,—without regard to its intrinsic merit,—lies in the season of its blooming, at a time when it actually has not competition from outdoor flowering plants. Yet, on the other hand, it is so easily grown and propagated that the flowers have become as abundant and cheap as field Daisies in summer, so that commercial florists do not find it profitable any more to handle them, and consequently are not anxious to encourage a fashion which results in their loss. However near or far off its day of doom may be, the improvements which have been accomplished in Chrysanthemum flowers, and the stimulus that has been given to floricultural taste in this city are of incalculable value, and their beneficial influence will remain, even after the fashion of the day has faded away.

New York Horticultural Society.

For the first time Horticultural Hall was taxed beyond its capacity, so that the basement of the large building had to be cleared and made accessory to the grand Chrysanthemum Exhibition held November 5th, 6th, and 7th.

The main hall was devoted exclusively to potted plants, while the cut flowers were accommodated in the lower floor. To one not versed in the intricacies of Chrysanthemum variations, the sight must have been bewildering, and from the expressions of delight and wonderment heard from most visitors, to many of them the show must have appeared a kind of revelation.

The standards were principally arranged on the rear platform so as to present a very ocean of blaze and color, the whole producing a grand effect. The height of the stems of the standards varied from two to five feet, the tallest specimens being in all eight feet high, but those of five to six feet produced a more pleasing effect. An odd looking innovation were the grafted standards raised by John Farrell, gardener to Wm. Barr. From four to six different varieties, each of a distinct color, had been grafted upon one stem, very much like different varieties of Apples or Pears may be grafted upon one tree. These singular-looking specimens, of which there were a dozen or more, attracted perhaps more attention than anything else in the hall, and to those who have limited space, and yet wish to grow many varieties, the plan recommends itself.

The bush plants were generally remarkably well grown, of an average height of three to four feet, and some over three feet in diameter. John Thorpe's seedling "President Cleveland," a beautiful white variety, was a magnificent specimen; it had nearly 400 flowers open at the time, and was sent to Washington and presented to the President, who was well pleased with the gift. "Mrs. R. Brett," deep golden, was another notably fine specimen plant.

But, beautiful as the pot plants were, the glory of the exhibition was in the cut flowers. A Chrysanthemum flower of *seven* inches in diameter may seem an impossibility to many of our readers,—it seemed so to us previous to this exhibition—but here they were, by actual measurement; flowers of six inches in diameter could be counted by the hundreds, per-

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haps thousands. It was a sight to be remembered, these rows upon rows of mammoth flowers, and yet, we fear, the exhibition of such artificially produced flowers may cause no small degree of disappointment to visitors who copied the names of the varieties expecting to raise like flowers by simply planting the variety. In order to produce such large flowers only a few flowers or only the terminal ones are allowed on the branches, all the lower buds being broken out; thus by concentrating all the nourishment of a branch into one flower its size increases to comparatively enormous dimensions. Yet the process is not difficult, and may be practiced by any amateur, and although the number of flowers is reduced, the actual amount of color on a plant and its effect is not diminished. The flowers from E. M. Allen, Woodbridge, N. J., which were the finest and most meritorious ones of all, were grown entirely out-of-doors, without any protection whatever, except a canvas covering during a few frosty nights.

The best twelve Japanese were: J. D. Childs, Mad. Lucraux, Fulton, *Striata perfecta*, F. Delaux, Blanche6 Neige, Soleil Levant, President Arthur, Mad. Moynet, *Gloriosum*, Mrs. Brett, Dan. Allen. The best six Japanese of one variety were Mrs. Brett. The best twelve Chinese were Jardin des Plantes, Cambridge, Mabel Ward, Mrs. M. Morgan, Prince Alfred, Empress of India, Lady St. Clair, Lord Wolseley, Duchess of Connaughr, B. Finlay, Fingal, Golden Empress. Six flowers of the latter were the best six of one variety. Among the Anemone flowered were some of the most perfect flowers on exhibition; the prize collection of twelve consisted of: Mad. Cabral, Gluck, Margaret d'Anjou, Lady Margaret, Timbale d'argent, Mad. Theresa Closs, Fabius de Medina, Fair Margaret, Acquisition, Soeur de Seville, George Sands, and the Manhattan.

Of new seedlings there was a large array, some of them distinct enough to find a permanent place on the lists, but when it is considered that nearly 700 varieties were here exhibited, distinct novelties must naturally become scarce in time.—*American Garden.*

THE BOTANICAL GARDENS IN JAVA.

During the last few years so many usefull and important improvements have been made in the botanical gardens at Buitenzorg and Tsi-Bodas that it might not be amiss if the attention of the readers of *Nature* were again drawn to these valuable seats of systematic and philosophical research.

On entering the gardens at Buitenzorg the stranger is at once struck with the wealth and luxuriance of the vegetation he sees, the great height of the trees whose trunks and branches are in many cases covered with heavy creepers, the dense copses of the different species of bamboo, the eccentric-looking screw-pines and the handsome palm trees; but the scientific observer is also struck with the care that has been taken to arrange all these many varieties of tropical plant life in, as far as possible, their systematic order, and that each specimen has its scientific, and in many cases its Malay name also, clearly and distinctly printed on a little board by its side.

It is not difficult for any one to find his way about the garden, and in a very short time he can discover the particular family or group of plants which he may desire to study. Many families have probably more representatives in these gardens than in any in the world. The Sapotaceæ, for instance, so rarely seen in Europe, are here represented by a great variety of genera and species, and the Palmaceæ, the Rubiaceæ, the Burseraceæ, the Orchidaceæ, and other families have now a large number of rare and interesting representatives.

The herbarium which is attached to the garden contains a large collection of dried plants and seeds collected together from the many expeditions into the little or unknown parts of the archipelago and from other sources. Attached to the herbarium there is a comfortable and convenient little library which contains most of the important botanical books and journals.

The laboratory, which, thanks to the energy of Dr. Treub, the director, is now completed, is a large, lofty and, for these climes, particularly cool room, and is well fitted out with reagents and apparatus for carrying on botanical research. The generous invitation which Dr. Treub has issued to naturalists, and to which the attention of the readers of *Nature* has already been directed, has attracted several scientific men of different nationalities, and some excellent research has already been made in this laboratory.

When I arrived in Buitenzorg, Dr. Treub was at Tsi-Bodas; so, after spending a few days in study in the gardens, I made the journey across the mountains to pay him a visit. The road from Buitenzorg to Tsi-Bodas crosses the Poenchuck Pass, and is full of interest and beauty. On the way the traveller passes quite close to the Talaga Werner, the crater of an extinct volcano which is now filled with water, and forms a most beautiful little lake hidden in the dense foliage of the mountain slopes. The path from the road to the lake is through a dense wood of fine forest trees, and amongst the undergrowth is found many fine shrubs and plants which are not found in the low-lying country beneath.

The gardens at Tsi-Bodas are situated on the slopes of the Gedeh Mountains, at an altitude of 5,000 feet, and here I found Dr. Treub at work in the comfortable little house which is attached to the gardens.

From this spot a very wide range of vegetation may be studied, from the rich and varied vegetation of the plains to the interesting vegetation of the Gedeh and Pangeranso peaks, at an elevation of 10,000 feet. In the gardens themselves a very fine collection of Coniferæ from America, China, Australia and other parts of the world has been got together, and spaces have been cleared for the growth of the various species of Eucalyptus, Cinchona and other plants. Year by year the surrounding forest is being encroached upon by these gardens to make room for new importations. I was extremely sorry that I could not prolong my stay at Tsi-Bodas, but I had to return to Batavia to catch the Molucca boat. I saw, however, enough to convince me of the great importance of these gardens for the advancement of our botanical knowledge and the great opportunities they afford for research into all branches of the science.

I need hardly say that the climate in this region is extremely pleasant and invigorating, and the neighbouring village of Sindanlaya is much resorted to by Europeans and others whose health has suffered on the coasts or low-lying districts of the Archipelago. At Buitenzorg the climate is by no means unpleasant or unhealthy, but as it lies a few thousand feet lower than Tsi Bodas, it is naturally a good deal warmer; but I am assured that several Europeans have worked there for several years without feeling their health the least bit affected.

It is hardly necessary to add that every one who has come over to Java to work in these gardens has been amply repaid for the time spent in the long journey over the sea, for the insight which can be gained here into what tropical botany really is one which can be gained nowhere else in the world so well, and leaves an impression which is not likely to be forgotten in a lifetime.—SYDNEY J. HICKSON.—*Nature.*

AN AMERICAN PEACH FOREST.

Mr. John H. Parnell, a great American peach-grower, has been letting out some of the secrets of his peach forest, which have more interest as Mr. John Parnell is the brother of another and more famous member of the family, Mr. C. S. Parnell himself. "In my early days," said Mr. Parnell to the correspondent, "I was advised that there were excellent hances for investment in the South, and especially in Georgia. It was my idea that thus located there was money in cotton, so I paid cash down 12,000 dols. for 1,500 acres. To this original purchase I have since added 500 acres, making my possessions 2,000 acres in all. For three years I planted cotton, only to find it a delusion." It was in this fortunate moment that Mr. Parnell made up his mind that there was money in peaches. The great peach forest is described as containing acres and acres of ground, stretching indeed into miles, covered with every variety of tree. The trees, which number 150,000, are planted twelve feet apart, and are kept trimmed to the ground, so that a person standing can pluck the rosy fruit from its fastness. When the first blush comes upon the cheek of the dainty beauties 100 men, women, and children are set to work, each armed with a flat basket, returning to the rendezvous when the bottom is covered. Thus they keep on day after day until the season is over. The story of Mr. Parnell's venture is briefly this:—He invested 12,000 dols. in his plantation. He has spent over 8,000 dols. since in trees, seeds, and labour. Upon this investment he makes from 8,000 dols. to 10,000 dols. a year, and would not sell his peach forest for less than 300,000 dols. Great as Charles Stewart Parnell is as the uncrowned

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king of Ireland, greater is John H. Parnell, the peach king of America. "I found it necessary to have recourse to English varieties. It was clear that a hard, firm peach which would bear handling would be a gold mine. In 1871 I brought from England 5,000 budded trees—the Beatrice, the Early Rivers, and the Early Louise. I have found that these three varieties meet every requirement. I have developed a hybrid, to which I have given the name of Parnell. This peach is destined to rank in the peach family as the La Conte does among the pears. I secured it from an accidental seedling. I made my first shipment of this peach five years ago, when it went off at 25 dols. a bushel. I have now seven thousand trees of this variety. It has a dark red skin, white flesh, and is firm and hardy for shipment. The next is the Foster, a peach of yellow skin, saffron flesh, and firm mould. But one crop in three of this peach, however, is fit to ship. Of the Amelia peach, dark-fleshed and brownish red cheek, I have over 8,000 trees. I have spent much time in experimenting, and believe that I have now solved all the difficulties of this neighbourhood. As old trees die I replace them, and also make a regular annual increase of 25,000 trees."

"The worst enemy of the peach orchard," remarked Mr. Parnell, "is the half-taught horticulturist with a pruning knife. There is no doubt but that peach trees understand the art of growing, and should be let alone. The borers will not do as much harm as the man who tries to exterminate them. If a tree yields bad fruit just cut it down and replant. The principal danger, however, is winter killing, which is a misnomer, because the killing takes place owing to the absence of winter. Where no winter comes the sun never sinks. A sudden cold day chills the tree, just as it does a man. I have fully exploded one idea prevalent, that it won't do to plant a new orchard upon the site of an old orchard. Thousands of my best trees are standing upon ground which has been the site of half a dozen previous orchards. Trees set out to the north-east never fail to have fruit. Peaches flourish in alternate years, sometimes one variety and sometimes another. In 1875 there was a wonderful yield of early peaches. In 1878 the crop was equally good, but in 1879 there was a peach famine which caught me two ways. The famine in Ireland deprived me of my rents, and the famine in peaches deprived me of my income here. In alternate years since, with wonderful regularity, the yield has upheld the theory. The earliest shipment ever made to New York was on the 16th of May, and the latest the 10th of August, when the Delaware crop cuts off the Georgia sales."

"The demand for good fruit has never yet been met. I always have more orders than I can fill. New York is the great market, because it is the distributing point, and always offers regular prices. Philadelphia stands next as an Eastern market. Cincinnati is the great peach depôt of the West. I once got 25 dols. a crate in Cincinnati. My heaviest shipment in one day was 900 crates to the New York market. Large quantities I send by freight and small quantities by express. In one year I netted 11,000 dols. This year I have already shipped 1,000."—*Pall Mall Budget.*

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Editorial Articles.

INDIAN FLOWER SHOWS.

THE subject of Flower Shows has been so frequently dwelt upon in these columns that we feel much diffidence in again approaching the subject, and were only our own interests concerned we should certainly refrain from doing so. Most of our readers are aware that we have taken up a position on this subject which, unfortunately, is in direct opposition to that of the august body whose opinion is supposed to be supreme in all matters pertaining to horticulture in this country. This we extremely regret, and could we see any way by which this diversity of ideas could be reconciled, we should only be too pleased at such a result. As far as we can see, the truth of the matter is this. The Agri-Horticultural Society of India have held a series of Shows, for, perhaps, a quarter of a century, under almost precisely the same rules year after year, with, perhaps, an occasional class added as some new genera of plants came into public favor, or others withdrawn when some old favorite species have gradually sunk into oblivion. Beyond this, scarcely any changes have been made in the programme, and while horticulture has been advancing with rapid strides, the conditions under which the Annual Shows are held still remain practically the same. On the other hand, we have probably advocated reforms which are of too sweeping a nature for the present state of horticultural opinion in this city,—not that we desire to withdraw any of the ideas we have brought forward, on the contrary we believe that it is only a question of time for them to be adopted *verbatim et literatim* ; but it is too much for us to expect that such a conservative body should at once embrace such a radical change.

Several of our town readers have addressed us on the subject of our failing to give a lengthened report of the recent Flower Show at Alipore, and we may candidly confess our reasons for not doing so. In the first place, as we remarked in our last issue, our criticisms regarding the Flower Show of 1885 caused a certain degree of ill feeling in high quarters, with an accusation that we were prompted by some personal animus in the matter, and we were desirous of preventing the repetition of such sentiments. Besides this, there were the reports in the *Englishman*, *Indian Daily News*, and *Statesman* of Feb. 11th, giving elaborate descriptions of the Show, and one and all of them were unanimous in declaring that the Exhibition was equal, if not superior, to any of its predecessors. Against such a concensus of opinion it was hopeless for us to raise a dissentient voice, and we therefore determined to maintain a discreet silence on the subject. We were glad to observe the *Statesman's* remarks on the necessity of every exhibit being properly named, and that the neglecting to do so caused much disappointment amongst connoisseurs. Our contemporary's remarks would have

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carried much more weight had he taken the trouble to give correct names to the plants specially noticed by him; as it is, he has added several new genera to our already overburdened vocabulary: for instance, we now have the following—*Anthurunus*, *Saccolabriums*, *Phalcenopsis* and *Eucharias*, and are also informed that the plural of *Maranta* is *Marantus*.

It is some satisfaction to us to notice that although the suggestions put forward by us last season were considered frivolous at the time, some of them were adopted in the schedule of prizes for the present season, notably that of reducing the number of plants in various classes. Besides this, our remarks on the injudicious system of allowing amateur and nurserymen exhibitors to meet on the same level have been adopted by some of our contemporaries, and even more forcibly so by some of our leading nurserymen. In our issue of February 3rd, 1885, we wrote as follows regarding the prizes offered :—

"In the Plant and Flower list we have 48 classes or 95 1st. and 2nd. prizes, varying from Re. 1 to Rs. 16, or a total of about Rs. 500; now every one of these classes are open alike to amateurs, Nurserymeu and Public Gardens without any distinctiou whatever. What chance can the former have in such a competition? The experience of past years proves that it is a very slight one, for on an average at least three-fourths of the prizes awarded have been taken by the two latter classes of exhibitors, and how can it be otherwise while the amateur is so heavily handicapped? In most instances he has to select his exhibits from a very small collection, which, however well they may be grown, can rarely be expected to be equal to those that may have been picked from, perhaps, a hundred or a thousand plants of any particular class. This one-sided system of competition instead of encouraging the spread of horticulture, is much more likely to have a deterring effect. It is all very well to say that, were it not for the numerous entries made by nurserymen and the various public gardens, the Show would inevitably prove a failure. Granted; but there is no reason why these should not be continued. We would only suggest that it would be more practicable to let them have separate classes of their own, and the competition amongst themselves will continue as keen as ever. While things remain as they are, it is impossible to expect that the private grower can be induced to enter into a contest where the chances are almost a hundred to one against his being successful; but let him once recognise the fact that he has only to meet his equals in the competition, and we should find many more amateurs willing to enter the lists.

"The system of providing special classes for what may be distinguished as private and public growers, is one that has been almost universally adopted, and everywhere with unqualified success, and why it has not been introduced here we cannot understand.

"The present arrangement at first sight may appear to be greatly to the advantage of the competing nurserymen, who are not only able to make a public display of their novelties or specialities, but at the same time are well paid for doing so; but even for them it has its disadvantages, and, in our opinion, these considerably outweigh any benefit they would otherwise derive. The tradesman's business rests entirely upon the popularity of horticulture, and it is certainly to his interest to encourage, by every possible means in his power, the development of a more general practice of its pursuits. Now under the present order of things, he has to enter into competition mainly with his own constituents; the effect of this is, not only to discourage many who already take a very great interest in these matters, but also deter many other would-be aspirants for fame, who would otherwise compete. We certainly think our nurserymen would best study their own interests by entirely withholding from competition until such time as more equable arrangements are made."

Although these remarks did not have the effect of inducing the Society to alter the Schedule of Prizes as suggested, it is very evident that they were adopted by some of the oldest exhibitors, for the *Indian Daily News* of February 11th says:—

"Baboo S. P. Chatterjee, who has always been a prominent exhibitor, was, we regret to say, an absentee on this occasion; his reason for not competing being, that as a florist it was hardly fair to compete with amateurs, many of whom were his own customers. The reason is perhaps a sound one."

An English writer on the subject of "Popularising Flower Shows" says:—"It is unfortunately not a common occurrence for the managers of Flower Shows to put forth their very best endeavours to make them a success, and then find themselves losers financially by the venture; but I am led to ask, do secretaries and committees of Flower Shows attempt all in their power to combine as much as possible the various local interests on behalf of the annual exhibition? I go to some country Shows, where, from the time I leave the railway station until the show ground is reached, there is a marked and an extraordinary absence of any indications that a Flower Show is being held. There must be a great absence of any popular interest and excitement when this occurs. Such Shows are rarely successful, and it will not unfrequently be found that they are in the hands of a few individuals,—generally a self-constituted authority—who do not work in sympathy with the populace.

"Here we have a very large summer exhibition, held always during the second week of July, which has become quite a district holiday, and that because all classes have been interested in the event. Let me endeavour to show for the guidance and encouragement of others how this has been brought about. The first step of importance was to change the day of the Show to that on which the shops closed earlier than usual. An immediate result was that the tradesmen instead of closing at five o'clock closed at two o'clock on the show day. Concurrently with this I had found that scarcely a tradesman subscribed to the funds of the Society. I was told they had been asked, but refused. I tried them on another tack. I said, 'will you give special prizes in kind, as articles of attire, garden tools, works of useful art, &c.' They did; and this summer I am able to announce as special prizes from tradesmen such things as a sewing machine, a silver watch, an alarum clock, a silver tea-pot; bow, quiver and arrows for archery; lawn tennis racquets and shoes; valuable articles of wearing apparel for men and women; pictures, cakes, &c., and lastly, a half ton of coals. What is the result? The tradesmen, their families and assistants, become interested in the awarding of these prizes, they go to the show and take their friends with them. By some fastidious persons all this is considered *infra dig*, and I

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had to combat this false sentiment at the outset, and I am happy to say overcame it."

Although the adoption of all the above suggestions would hardly be feasible in this country, where we have such a different class of exhibitors to cater for, still the main argument holds good, and that is—that to make a Flower Show really popular you must first obtain the sympathy and support of the community generally. This fact was forcibly illustrated by the grand measure of success that attended the Flower Show held at Allahabad on February 20th. We must admit that when we were first invited to attend the Show we had some hesitation in accepting it. At first sight it appeared scarcely probable that it would be worth while to travel upwards of five hundred miles to a Mofussil Show, when the exhibitions held in our City of Palaces are far from coming up to our standard of excellence. On perusing the schedule of prizes offered, there were, however, two or three points that forcibly struck us,—first, that the total amount of prizes (nearly Rs. 1,000) had been raised entirely by voluntary subscriptions; secondly, that it was under the management of a powerful and independent local committee; and thirdly, that, with the exception of a few specially provided classes, the whole Show was specially intended for amateur gardeners. Here were the very ideas that we had fought so long for, and hitherto fought in vain, being put into practical operation, and for this reason, if for no other, we determined on availing ourselves of the opportunity provided us of seeing them put to the test. The results of the Show certainly exceeded our most sanguine expectation, and would compare favourably with any of our Calcutta Exhibitions. A full report of the Show is given in another column, so that we need not dwell on the subject here; suffice it to say that every class was well represented, some of them bountifully so. In the class for Pansies alone there were upwards of twenty entries, and in all the other annual classes there were an average of at least ten exhibitors. What a striking contrast this is to the same section at the recent Show at Alipore, where in no class were there more than two or three entries, and these almost exclusively from our public gardens. Some of our readers may imagine that this is owing to the climate of the North-West Provinces being better adapted for Annuals; such, however, is not the case, and if there is any difference at all, we should say that it would be in our favour. It must be admitted that some of the Annuals shown at Allahabad were not up to Exhibition form, in fact many of them might be put down as second rate only; but these entries are certainly preferable to empty benches. If every exhibitor were to show only such plants as he was perfectly convinced must win, the majority of Flower Shows would dwindle away to nothing.

While on the subject of Flower Shows, we would draw attention to an announcement that appears in our advertising columns regarding the Grand Horticultural Fête at the Zoological Gardens, Alipore, on Saturday, March 20th. The Show, it will be observed, is to be held on behalf of the Countess of Dufferin's Fund, and if for this reason alone, it deserves the hearty support of the public. Now to have a Flower Show worthy of the name a liberal prize fund must be provided, and if that were to be deducted from the proceeds but little would be left to make over to the noble scheme for which it has been promoted. Messrs. Thos. Cook & Son have therefore appealed to the public for subscriptions to enable them to offer suitable prizes, and we feel assured that this appeal will be liberally responded to. Up to the time of our going to press the schedule of prizes has not been issued, so that we are unable to place it before our readers; but from information placed at our disposal, we are able to state that a liberal list of prizes will be awarded; that separate classes will be provided for amateurs and nurserymen, so that all classes of growers will have an equal chance of success. We trust that our Calcutta amateur gardeners will take advantage of this opportunity and come forward in large numbers. Every one cannot of course be successful, but each can contribute his quota towards making the Exhibition worthy of the noble object for which it has been promoted.

Editorial Notes.

In Russia the oil expressed from sunflower-seeds is largely employed for adulterating olive-oil. The purified oil is considered equal to olive-oil for table use.

To remove rust from tools, first scour them with emery moistened with sulphuric acid diluted with six volumes of water, rinse dry, and finish with oil and emery flower.

Sugar Cultivation in British Guiana.—From a recent return of the Crown Surveyor of British Guiana it seems that in Demerara 40,877 acres of land are under sugar cultivation, while in Essequibo 18,286, and in Berbice 15,294 acres are under similar culture.

Prolonged freshness is secured by standing flowers in water for some hours before they are sent away. It is the greatest fallacy to suppose that any which have to be sent to a distance should be fresh picked. They will travel better and last longer if allowed to imbibe a full supply of moisture before starting.

Coleuses.—These can be grown to a great size in comparatively small pots, providing liquid manure is freely given. Overpotting is the cause of many a failure in growing Coleuses. Some of the now innumerable new varieties are strikingly beautiful, but many of the older varieties are very ornamental, and as a rule more easily grown.

Fruit Trees on Saxon Highways.—The planting of the highways in Saxony with fruit trees is proving financially a very successful experiment. During the last three years the State received from this source—1882, 87,844 Marks; 1883, 110,161 Marks; 1884, 103,213 Marks; together 301,218 Marks. Wood sold also produced from 12,000 to 13,000 Marks. These amounts were received after the expenditure incurred in leasing and in auctions had been deducted.—*Kuhlow's German Trade Review.*

The sudden introduction and increase of garden vegetables in England about the time of Elizabeth did for leprosy, till then a never-ceasing plague, what medical art could never accomplish; it was banished by their providing the means of healthy blood. Previously the food gave to the blood an excess of phosphates and caused a nearly total absence of alkalies, so that its quality was depraved and its functions were destroyed.

Fruit as a Medicine.—The regular and moderate use of well-ripened fruit is not so widely appreciated as it should be. Resi-

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dents in regions where more or less malaria prevail, have, according to a writer in the "Country Gentleman," discovered that nothing is a surer preventive of its deleterious effects than a regular supply of fruit. Fruit will not only prevent disease, but in some instances it has proved one of the best medicines to cure it.

ORANGES AND LEMONS IN GREECE.—Greece and the Levant are countries in which Lemons and Oranges grow in abundance, and Dr. Landerer, of Athens, in a communication received from him on the subject, states that more than 100,000,000 Lemons, Oranges, and Citrons are consumed or exported by the inhabitants of various parts of Asia Minor. There are also met with all the other sorts of fruits of the family Hesperidæ, such as Citrus indica, commonly known as Mandarins. The fruits of Citrus Cedro and Citrus decumana are collected for the preparation of the confection Citrinate.

SOME idea of the magnitude of the business of raising sweet-scented flowers for their perfume alone may be gathered from the fact that Europe and British India consume about 150,000 gals. of handkerchief perfumes yearly; that the English revenue from eau de cologne is £8,000 annually, and that the total revenue of other perfumes is estimated at £25,000 annually. There is one great perfume distillery at Cannes, in France, which uses nearly 100,000lb. of acacia flowers, 140,000lb. of rare flower leaves, 32,000lb, of jasmine blossoms, 20,000lb. of tuberose blossoms, and an immense quantity of other material.

CAMPHOR IN CHINA.—Reporting on the trade of Tamsin, China, the Commissioner of Customs says that the trade in camphor is represented in the returns by such an insignificant figure that there is great fear of its total extinction in the near future. The immediate cause of its rapid collapse may be traced to the eagerness of the Chinese to acquire, by all possible means, as much territory as possible. During the last three years hills thickly wooded with camphor trees have been burned over by the Chinese, in order to compel the savages to withdraw. Destruction on so large a scale naturally tells on the camphor trade. Forests of camphor trees do still exist further inland, but the absence of all beaten tracks across the mountains renders them difficult of access.—*Gardeners' Chronicle.*

BAMBOO.—There is nothing like science for enlarging the mind. Take bamboo for instance, which most people would define as a hollow, jointed stick of varying size with lance-head-shaped leaves. Bamboo, we all know, is one of the most useful productions of nature. But we can scarcely recognize our old friend when described as a plant the leaves of which "are said to be tussic, tonic, anthelmintic, stomachic and carminative," and the root "cooling, tonic, and alexipharmic." Another species "is prescribed in the form of a decoction of the leaves or root in diseases of the head, chest, &c." A wash of the leaves in certain other diseases. "Bamboo juice is prescribed in catarrh, fever, acute cerebral, spinal, and bronchial affections," and so on. But this really quite carries our familiar acquaintance into another world. I knew that the use of the bamboo *stick* frequently caused "acute cerebral affections" (vide police reports *passim*). It is news to learn that its juice taken internally provides a cure!—*Singapore Free Press.*

INFLUENCE OF LIGHT ON THE GROWTH OF PLANTS IN HIGH LATITUDES.—In a valuable treatise on the vegetable productions of Norway, which has been published by Dr. Mueller, some extraordinary facts are related respecting the influence of the long duration of light during the summer months on the growth of vegetables in the higher latitudes in Norway. At 70° N. it was found that ordinary Peas grew at the rate of 3½ English in. in twenty-four hours for many days in number, and that some cereals also grew as much as 2½ in. in the same time. Not only is the rapidity of growth affected by the constant presence of light, but those vegetable secretions which owe their existence to the influence of actinic force on the leaves are also produced in far greater quantity than in more southern climates, since the colouring matter and pigment cells are found in much greater quantity, and the tints of the coloured parts of vegetables are consequently deeper. The same remark applies to the flavouring and odoriferous matters, so that the fruits of the north of Norway, though not equal in saccharine properties, are far more intense in flavour than those of the south.

THE TRANSPLANTING OF TREES.—A contributor to *Farm and Fireside*, in his directions respecting the treatment of trees before their removal, writes as follows—"A tree in full leaf may be compared to a powerful pump, the roots absorbing water from the soil, which is carried upward through the stem and exhaled from the leaves in the form of vapour. If now the principal portions of the roots be cut away, and especially the fine rootlets which are farthest from the stem and through whose extremities nearly all the water is absorbed, the leaves, if allowed to grow, will exhaust the water from the stem and roots more rapidly than it can be supplied by the remnant of the latter, and the consequence will be the destruction of the tree. Hence, in transplanting trees, the leaf-bearing twigs should be cut away in proportion to the loss of roots, and it should be remembered that the root-surface is generally equal to that of the twigs; consequently the safest rule is to remove nearly all the branches, trimming to bare poles. It is hard to do this, but the aftergrowth of the tree will be rapid enough to compensate for the apparent loss. In moving large trees it is an excellent plan to dig down and cut off a large portion of the roots a year before transplanting, removing a portion of the top at the same time. This will cause the formation of new rootlets near the stem, which may be preserved in the final transplanting."

SOOT WATER.—As a cheap and easily made reliable fertilizer this is of great value. It may be used with much advantage wherever plants are grown in pots. There is no kind of plant it does not benefit, and it may be given to those which produce fruit, flowers, or fine foliage. It has the virtue better than any other fertilizer of clearing worms from the soil in pots, and this is a great gain in itself. No kind of of worm will remain in the soil which receives a supply of soot water occasionally, and it causes foliage, fruit, and flowers to assume a much darker colour than they do when it is not used. It imparts extra vigour, and may be used all the year round. Ferns are especially benefited by it, and the fronds assume a deep green colour under its influence. Strawberries in pots, Pines, Vines, Pelargoniums, Fuchsias, and indeed all plants improve in texture and appearance from its use. It may be used to expel worms before the pots are full of roots, but as a general fertilizer it should not be much employed until the roots have taken to soil freely. It is not wanted until then. Many have much difficulty in getting the soot to mix with the water, but this is easily enough managed. Any ordinary old bag should be taken; half fill it with soot, put a brick or large stone inside, tie up the mouth, and put into the tank or barrel with the water. In a short time the water will have penetrated through every particle of the soot and converted it into a pulp. The water is then in excellent condition for use. It may, however, be too strong for giving to the plants as it is, but a quantity of it may be lifted and put into the pans with clear water, the strength to apply it being a matter which can only be determined by the cultivator.—J. MUIR, Margam.—*Journal of Horticulture.*

WE have to acknowledge the receipt of Messrs. H. Cannell & Sons' Floral Guide for 1886. To those who have seen the former editions of this wonderful production it is unnecessary for us to say anything in its praise; but to any of our readers who have not done so, we can only say, obtain a copy at once, that is, if they are intending purchasers of either plants or seeds. We say *intending purchasers* advisedly, for it would be doing the publishers an injustice to recommend it to the attention of what may be termed professional catalogue collectors (and there are many such in this

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country). An instance of the avaricious greed of this class of gardeners came under our notice a short time since. When calling on a gentleman residing in one of our mofussil stations we remarked that a shelf in his library was entirely devoted to Horticultural Catalogues, and there were perhaps fifty or sixty publications including those of all the leading English and Continental seedsmen and nurserymen. This great interest in trade literature was strangely at variance with the little interest apparently bestowed on his garden, which presented a poor, weedy appearance. We could not however forbear venturing a remark that, from such a host of catalogues, our friend must be in the habit of importing large quantities of plants and seeds. No! he certainly enjoyed looking over catalogues, but he ordered very little from them. All he imported last year was a guinea collection of Flower Seeds from a second or third-rate firm, who had probably had little or no experience of the requirements of an Indian climate; the consequence was an egregious failure—and we should say deservedly so. Messrs. Cannell & Sons' publication can hardly however be looked upon as an ordinary trade catalogue: it is far more than this, containing not only a most complete and reliable descriptive list of every description of soft-wooded plants, but also a vast amount of valuable information on the culture of all the most prominent genera.

Original Articles.

THE ROSE.

Summer Roses (*continued from page 101*).

French Roses (*Rosa Gallica.*)

Out of the many thousands of varieties of this once popular group that have been introduced from time to time, there now remains scarcely more than fifty in cultivation, and even with this small remnant of a once glorious army not more than half a dozen kinds are generally cultivated. They are well adapted for cultivation in our Hill stations; and thrive in any good garden soil They require careful pruning; all the weakest wood should be entirely cut out, leaving only four or six strong growths, and these must be cut back to six or eight eyes from the base or to the first plump bud.

Name.	Description.	Habit of Growth.
**Boula de Nanteuil*	crimson-purple centre sometimes fiery	rob.
**Blanchefleur*.....	white, slightly tinted with flesh	rob.
Cynthie	pale rose, light margin, beautiful, large	mod.
D'Aguesseau	crimson, richly shaded with purple, large and full	mod.
**Duchess of Buccleuch*...	dark rose, margin blush, beautiful	vig.
**Kean*.....	rich velvety purple, centre scarlet	vig.
Marjolin.....	purple, large and full	rob.
Œillet Parfait	pure white, with broad stripes of rosy crimson, beautiful, very double	dwf.
**Ohl*	dark crimson and scarlet shaded, large.....	rob.
Perle des Panachees.....	white, striped with rose.....	mod.
Rosa Mundi	red, striped with white, sometimes all red; large and semi-double	mod.
Village Maid.....	white, striped with rose and purple, large and full, of cupped form	mod.

Hybrid China Roses.

This group originated by crossing the French and other summer blooming Roses with the Chinese, Tea-scented and Noisette varieties. They are of a very hardy nature, and grow most luxuriantly in a cool climate, but are not adapted for cultivation in the plains; they must be pruned very sparingly. The following varieties can be recommended:—

Name.	Description.	Habit of Growth.
Blairri, No. 2.....P S	rosy blush, fine large petals, very handsome foliage; fine pillar or weeping Rose	vig.
Brennus .....P	deep carmine, a handsome old variety, which forms a noble standard or pillar ...	rob.
Chénédolé.....P	brilliant glowing crimson, very showy, and a superb Rose; forms a noble standard or pillar Rose	rob.
Comtesse de Lacépède...P	silvery blush, very distinct and beautiful ...	vig.
Double Margined Hip...P	creamy white, beautifully edged with pink; a very pretty Rose	free.
Fulgens ..... P	bright scarlet-crimson, colour exquisite; a fine old Rose very showy. and an exquisite pillar or weeping Rose	vig.
Leopold de Baufremont P	fresh rosy pink, shape perfect, beautiful, compact, free-blooming, and a fine pillar Rose	vig.
Madame Plantier ....P	pure white, an abundant bloomer, and a good pillar Rose	vig.
Madame Riviere (Eug. Verdier fils) .....P	very beautiful and delicate bright rose, very large, full, and well formed	
Magna Rosea .....P	light blush. tinted with pink, very large and showy.....	vig.

Hybrid Bourbon Roses.

This family of Roses has been produced by crossing the French, Provence and other summer Roses with the Bourbons. They are generally of a more vigorous habit than the preceding, being readily distinguished from them by their broad stout foliage. They require the same treatment as the Hybrid China, but may perhaps be pruned rather more freely.

Name.	Description.	Habit of Growth.
Catherine Bonnard.....P	cerise-crimson flowers, moderate size, full, and well formed; a good pillar Rose	
Charles Lawson..... S P	bright rose shaded, very large and double; a fine Rose	rob.
Coupe d'Hébé..... P	delicate rosy flesh, large and double; one of the most beautiful of summer Roses ...	vig.
Juno.....P	pale rose, globular, very large and full; a handsome Rose, and good for a pillar.....	rob.
Madame Isaac Pereire (Margottin fils) ...S P	beautiful vivid carmine, full, of immense size, perfect imbricated form, blooming all the season; growth very vigorous; first-class variety	vig.
Madame Jeanne Joubert (Margottin) .....P	fine carmine, large and imbricated, blooming late in the autumn; a good garden Rose	vig.
Paul Perras .....P	pale rose, very large and handsome; makes a fine standard or pillar Rose	rob.
Paul Ricaut .....S	brilliant carmine, very large, most exquisitely formed, and very beautiful	mod.
Souvenir de Mons. Fuivre (Levet)	fine scarlet-red, with slaty reflex, very large, full, and well formed.....	vig.

The Damask Rose. (*Rosa Damascena*).

The only variety of this group that can be cultivated with success in the plains is the well known Bussoorah, so extensively grown in various parts of the country for the production of attar and Rose water. The Bussoorah is only valuable for its glorious perfume, for the flowers are only semi-double, with thin flimsy petals and very evanescent in colour, in fact lacking all the points that should be found in a good Rose.

Mr. W. Paul in the "Rose Garden" says: "Formerly all dark Roses were termed Damask, probably from the first dark varieties having borne this name. But there are now dark Roses belonging to every section, and there are Damask Roses of every colour. The Damask are readily distinguished from others by a robustness of growth, in conjunction with rough, spinous shoots and downy corrcaceous leaves of a light green colour. Owing to this latter feature they present a striking contrast when introduced among other groups. The flowers are mostly of fair size; some are large, and all are showy."

The Damask Rose is allowed to be of great antiquity. Some suppose it to be, of this Virgil speaks in the Georgics and elsewhere. It is generally believed that it was first introduced from Syria, and brought to England in 1573. But Johnson, in "The History of Gardening" says:—"The learned Linacre, who died in 1524, first introduced the Damask Rose from Italy." Who will fight the battle? We must not pause to do so; wherever the truth may lie, it is evident that this Rose has been cultivated in England for a great length of time, and it affords a striking example of the treasures Nature's plants are capable of yielding beneath the hand of the industrious cultivator, of the power given unto man to improve by his labor the races of the vegetable world.

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For two hundred years this Rose underwent but little change, but modern Rose growers have improved and varied it to such an extent, producing through it first, Damask Perpetual, then Hybrid Perpetual, that the favourites of so long standing are threatened with oblivion."

Name.	Description.	Habit of Growth.
La Ville de Bruxelles ...	light rose, margin blush, l rge and full	vig.
Leda or Painted	blush, edged with lake, full.....	rob.
Madame Hardy.....	white beautiful, large and full.....	vig.
Madame Stolts	pale straw, cupped	vig.
Madame Soetmans	creamy white, shaded with buff, large and full	vig.
York and Lancaster ...	red and white, striped, large and full, liable to sport.....	vig.

Rosa alba.

Rosa Alba, or the White Rose, so named probably because the original species is white, forms a small but interesting group of old fashioned Roses none of which we believe have ever been cultivated in this country. They would probably grow vigorously in the Hills, but it is doubtful if they could be induced to thrive satisfactorily in the plains.

Name.	Description.	Habit of Growth.
Blanche Belgique	white, very floriferous.....	mod
Belle de Segur	soft rosy flesh, edges blush, beautiful, of medium size, full, form cupped.....	rob.
Celestial or Maiden's Blush	flesh colour, beautifully tinted with the most delicate pink, of medium size, double, cupped	mod. mod.
Felicite (Parmentier) ...	rosy flesh, margin blush, large and full.....	rob
Madame Audot.....	glossy flesh, large and full.....	mod.
Madame Legras.....	creamy white, large and full.....	mod.

Scotch Roses.

Rosa Spinosessima, or the Scotch Rose, is, as the name implies, a native of Britain; its cultivation, we believe, has never been attempted in this country, nor is it likely that it would succeed except at a high elevation.

Boursault Roses. (*Rosa Alpina*).

The species of this group are entirely distinct from any other section of the Rose family. The shoots are long, very smooth and flexible, and in most instances entirly free from thorns. The plants grow vigorously enough in the plains, but can rarely, if ever, be induced to flower freely, and when produced are invariably weedy worthless things. In the Hill stations, on the contrary, they bloom very profusely, producing their flowers in large clusters, perfect in shape and of good size, but rarely double.

Austrian Roses (*R. lutea*).

Harrisonii and the *Persian Yellow* are the showiest Yellow Roses in cultivation. The latter cannot be too highly recommended; its flowers are of a deep golden yellow, and the young leaves have the fragrance of the Sweet Briar. It blooms freely under ordinary treatment, but requires care in pruning; the head should be well thinned, and the shoots that are left for flowering suffered to remain long. Suitable only for cultivation in the Hills.

Name.	Description.	Habit of Growth.
Austrian Yellow	single.....	mod.
Austrian Copper	single.....	mod.
Harrisonii	fine golden yellow, double, flowers profusely	rob.
Persian Yellow	the deepest yellow, large and full, superb. ..	mod.

Rosa Sulphurea.

The flowers of this variety are of the deepest and brightest yellow found among Roses of good globular form, very large and full. Unfortunately it is notorious for refusing to expand its blooms, and this character has adhered to it for upwards of two hundred years. Parkinson, a writer of the seventeenth century, says:—"The flower is so thick and double, that very often it breaketh out on one side or another, but few of them abiding whole and fair in our country." We remember seeing several plants of this species at Mussoorie a few years since, and on making enquiries were informed that they bloomed freely year after year, but rarely produced a perfect flower. We have plants in Calcutta that are growing vigorously enough, but although planted upwards of four years have never flowered.

Sweet Briar (*Rosa rubiginosa*).

This dear old favorite is almost too well known to need description: it is common all over India, and grows freely if left to itself, and should never be pruned. It must be propagated either by budding or grafting as cuttings cannot be induced to strike. We have only met with one variety in cultivation in India, and this is probably the wild type of our English hedgerows. The following varieties are now grown in Europe:—

Name.	Description.
Celestial	flowers pale blush.
Double White.....	flowers white.
Double Scarlet	flowers rosy red.
La Belle Distinguée	flowers bright red. cupped.
Splendid	flowers light crimson.
Superb Red	flowers bright red, very sweet.

Climbing Summer Roses.

The various groups belonging to this section, like those described above, are, with but one or two exceptions, only suitable for cultivation in the Hills.

Ayrshire Roses (*Rosa arvensis*).

These may be described as running Roses; their growth is very slender and extremely rapid. They are of a very hardy nature, and for planting in rough situations where others will not thrive, for covering old walls, trees or pillars, they have no equal. Being natives of Europe, they can only be grown successfully in this country at a high elevation.

Name.	Description.
Bennett's Seedling (Thoresbyana)	white, small and double.
Dundee Rambler	white, semi-double.
Madame Viviand Morel	carmine-rose, tinted with cerise; flowers of medium size, full, and finely formed, produced in clusters, extra fine, blooming in autumn.
Ruga	pale flesh, large and double.
Splendens	flesh colour, large and double.
Virginian Rambler	in the way of *Dundee Rambler*, but the flowers shaded with pink; admirable for weeping.

Evergreen Roses. (*Rosa sempervirens*).

This species is not actually evergreen as the name would imply, although it retains its foliage in a cold climate longer than that of any other member of the Rose family. In this country however, where the majority of Roses are more or less evergreen, the peculiar characteristic of of *Rosa sempervirens* is of no value. In very bleak situations, at a high altitude, it would doubtless prove exceedingly useful. The flowers are small but extremely double, and are borne in dense drooping corymbs of from twenty to fifty blooms each. In pruning all the thin wood should be removed, and the shoots left for blooming should simply have their tips pinched off.

Name.	Description.
Donna Maria	pure white, small and double.
Felicite Perpetuee	creamy white, beautiful, small and full
Flora	rosy flesh, full.
Leopoldine d'Orleans.....	white, tipped with red, small and double.
Myrianthes Renoncule ...	blush, edged with rose, small and double.
Rampante	pure white, double.

Rosa Multiflora.

The varieties belonging to this group, although they grow vigorously enough in the plains, produce but very insignificant flowers, and then very sparingly after being planted for several years At an elevation of about 5000 to 6000 feet in the Himalayas they seem to find a home in every way congenial to them, blooming most profusely year after year without any attention being given them.

Polyantha Roses. (*R. polyanthus*).

Japanese Roses, producing white flowers, and closely allied to, if not varieties of, *R. multiflora*. They are of very rapid growth, and valuable for climbing.

Name.	Description.
Bijou de Lyon	pure white, small, full, and imbricated, produced in clusters.
Double (Duplex)...	double white.
Single (Simplex)	single white.

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Banksian Roses. (*Rosa Banksiæ*).

The Banksians are tender evergreen Roses, very vigorous in growth, with small and beautiful shining leaves. No pruning is required until they become much crowded with branches, when a portion of the strongest shoots may be removed; all the weaker ones should be left, as from these the flowers are produced.

Name.	Description.
Fortuniana	white, large and very sweet; introduced from China ... .
White.....	White, very fragrant, scent of the violet.....
Yellow	yellow, flowering freely in small clusters.....

Rosa ternata or *Rosa lævigata*, a very common plant in Bengal, also belongs to this group; it is of very rampant growth with bright glossy foliage, its pure white single flower being produced in dense clusters.

Rosa Gigantea.

This species is described by Firminger as producing no flowers, such is not however the case; in its wild state it flowers as freely as the common Dog Rose: under cultivation it certainly blooms very rarely, except on plants that have been left entirely undisturbed for some years, and yet *Rosa gigantea* is probably the most useful Rose in our gardens in Lower Bengal, for we depend almost exclusively upon it for stocks on which to graft our Hybrid Perpetuals, Teas and Noisettes. It roots more freely than any other species with which we are acquainted, and is the most obliging foster parent in the whole Rose family.

ALLAHABAD FLOWER AND VEGETABLE SHOW.

The subjoined list tells who won the prizes at our recent Show, and all said, a very good show it was. The flowers were good, the vegetables more than good, most excellent as a rule. Opinions differ as to whether the display of this year generally was equal to its predecessor. Perhaps the vegetables were better, the flowers hardly up to last year's mark, and this, especially in the case of roses,—though Lady Lyall's display, by the way, was a fine one—the roses having suffered from the recent exceptionally cold winds of the previous fortnight. Our Allahabad roses are charming, nowhere in India better, and it might be quite permissible to arrange the next anniversary of the Show with special reference to their best season. But then arises the question—what precisely is their season? Mr. Weathrall, one of our most successful local growers, dates their prime about the end of January. Does he forget the frosts? Again, the truth is that the rose is amiable as it is beautiful—a combination rarely found out of the flower-bed—and that the period of its best blooming is in no small degree regulated by the date the parent tree is pruned. On the whole, however, we should prefer the 1st of February to the 10th or 20th for the next Show. Among the flowers, Mrs. Brodhurst's scarlet geraniums were exceptionally fine, whilst the annuals in pots exhibited by Lady Lyall were at once an envy and an encouragement to her competitors. Mr. Fairlie's foliage plants, and particularly Mr. Crowley's crotons, were worthy of all praise, whilst descending, if descent it necessarily be, to the domain of the purely useful, Mr. Berrill was supreme in vegetables. But where, oh! where, was Mr. Wright, who left every one in the lurch in this class last year? The Commissioner and the Collector helped the exhibition by every means in their power, whilst Mr. Phillips, the Superintendent of our Public Gardens and Secretary to the Show, assisted by Mr. R. Barton West, of Calcutta—another professional—awarded the prizes with a discrimination that left no room for discontent. It remains only to be said that all our local world was at the Show, great and small, and that in Allahabad means a goodly gathering.

PRIZE LIST.

Best.	Flowers and Plants.	1st Prize.	2nd Prize.
12	Species ornamental foliage plants ...	R. A. Fairlie.	T. Crowley.
12	Pots Geraniums ...	Hon. M. Brodhurst	Mrs. Watling.
6	Varieties of Heartsease or Pansies	Lady Lyall.	Hon. M. Brodhurst.
6	Pots Petunias, varieties...	G. W. Allen ...	Lady Lyall.
6	Pots Verbenas ...	Lady Lyall ...	W H. Wright.
6	Pots Stocks ...	R. S. Lovejoy ...	H Smythe.
6	Pots Phlox ...	Lady Lyall ...	A J. Lawrence
6	Pots Nasturtiums ...	Lady Lyall. ...	A J. Lawrence.
6	Pots Daisies ...	Lady Lyall. ...	R S Lovejoy.
6	Pots Asters ...	Lady Lyall. ...	W. H Wright.
6	Pots Oxalis ...	Lady Lyall. ...	E Berrill.
	Separate collection of 42 pots of annuals ...	Lady Lyall. ...	A J Lawrence.
	Collection of ferns in pots	R. A. Fairlie. ...	T. Crowley.
	Do. 6 pots (not less than 3 varieties) ...	R. A. Fairlie. ...	T Crowley.
	Do 3 pots (different varieties) ...	R. A. Fairlie ...	T. Crowley.
	Basket or pot of Maiden Hair Fern ...	Miss Brodhurst.	
	Araucaria plant in pot or tub ...	T. Crowley.	
12	Varieties of Crotons in pots ...	T. Crowley ...	R A Fairlie.
6	Do. do. ...	T. Crowley.	R A Fairlie
3	Do. do. ...	T. Crowley ...	R. S Lovejoy.
6	Do. Begonias ...	R A Fairlie.	
6	Do. Coleus ...	Lady Lyall ...	T. Crowley.
6	Do. Cacti ...	R. A Fairlie ...	Hanuman Pershad.
3	Do. Panax ...	R. A Fairlie.	
6	Palms (not less than 3 varieties) ...	R. A Fairlie ...	W. H Must.
12	Pots of Violets ...	E. Berrill ...	T. Wharton.
6	Varieties of Roses in pots or tubs ...	C. R. P. Weathrall.	

Special Prizes open to Public Gardens and Nurserymen as follows :—

	Collection of Crotons ...	R B. West. ...	J. C. Biswas.
	Foliage Plants. ...	R. B West. ...	J. C. Biswas.

Cut Flowers and Bouquets.

	Collection of cut flowers	Judge Elliot. ...	Miss Wharton.
	Arranged bouquet by mallies. ...	Durga Parshad ...	Siva Parshad.
	Arranged small bouquet by mallies. ...	Binda. ...	Behari.*

* 3rd prize—Doorga.

Cut Rose.

6	Marechal Neil ...	H. Smythe. ...	R. G. Watling.
6	La France ...	Mrs. Brodhurst.	
6	Paul Neron ...	H. Smythe. ...	Lady Lyall.
6	Geant-des-Batailles ...	Lady Lyall.	
6	Moss ...	Lady Lyall.	
6	Souvenir-de-la Malmaison,	Lady Lyall. ...	H. Smythe.
24	Cut roses in one box, not less than 12 varieties.	Lady Lyall. ...	H. Smythe.

Special Ladies' Prizes.

Arranged bouquet ...	Mrs Crowley.	
Do. Vase or Dinner Table-glass. ...	Miss Collis.	

Vegetables.

	Dallie of mixed vegetables (given by the Hon. M. Brodhurst,) ...	E Berrill. ...	Lady Lyall *
6	Cabbages ...	E. Berrill. ...	Lady Lyall.
12	Brussels Sprouts ...	T. Wharton. ...	G. W. Allen.
12	Knol-khol ...	Lady Lyall ...	Judge Elliot.
12	Lettuce ...	Lady Lyall. ...	Judge Elliot.
	Basket peas, 2 seers ...	G. W. Allen. ...	E. Berrill.
6	Beet-root ...	Lady Lyall. ...	W. H. Wright.
12	Carrots ...	M. Logan. ...	W. H. Wright.
12	Turnips ..	M Logan. ...	E. Berrill.
12	Tomatoes ...	Lady Lyall. ...	W H. Must.

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12	Onions ...	E. Berrill. ...	W. H Must.
6	Cauliflowers ...	T. Wharton. ...	T Conlan.
6	Sticks Celery ...	H. Smythe. ...	E. Berrill
1	Seer Potatoes ...	E. Berrill. ...	W. H. Wright

* 3rd prize—G W. Allen.

Fruit.

12	Sylhet Oranges ...	W. H. Must. ...	Mahes Parshad.
12	Kagzee Limes ...	Lady Lyall	
12	Citrons ...	W. H. Must. ...	Lady Lyall.
6	Pummelows ...	Capt. A. Porter,...	Lady Lyall.
12	Guavas ...	Lala Ram Charan.	
	Dish of Cape Gooseberries	E. Berrill.	
	Bunch of Plantains. ...	W. H Wright.	

Special Prizes.

Dinner Vase ...	.... Mrs. Allen
6 Heliotropes ...	... Lady Lyall.
6 Leeks	... W. H. Wright.
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J. PHILLIPS.

Honorary Secretary.

—*Pioneer.*

NOTES ON ORCHIDS.

Since Orchids have become much cheaper, and their cultivation better understood, there appears to be more than ever amongst gardeners, and those interested in flowers generally, a strong desire to form a collection, or at least to be in possession of a few useful kinds. It is to these useful kinds that I shall chiefly refer, rather than to the choice and rare species that are found in Orchid-growing establishments. The popularity of Orchids for decorative purposes has considerably increased during the past few years, and no one can wonder at this, seeing how valuable they are for cutting and for adorning plant houses. The fragrance of many varieties adds to their charms, and the peculiar characteristics of others command attention. Further, few plants retain their flowers in good condition so as long some Orchids do, continuing as they do for six, eight, or ten weeks in conservatories or other structures that have to be decorated with flowering plants. It is, doubtless, on account of this combination of properties possessed by Orchids that we find a few plants in many establishments, not, however, always the most desirable varieties for general usefulness. There are also many admirers and cultivators of flowers who as yet have not attemped the culture of Orchids; therefore only those that are cheap, afford abundance of bloom, and are comparatively easy to grow will be enumerated—such that even an ordinary plant-grower with only moderate accommodation may cultivate successfully. They are old but good, and are additionally useful by flowering during winter and spring, when flowers are particularly cherished.

The first on our list is Cyprepedium insigne, one of the oldest and most useful, although perhaps not the most beautiful when compared with C. Lowii, C. Stonei, C. Parishii, the charming little C. niveum, or the remarkable C. caudatum. Yet C. insigne is more useful for the decoration of the conservatory than any of those named; it produces its flowers throughout November and December, and they last in good condition for ten weeks. Where choice flowers are required this should be grown in quantity; it is easy to manage, and will flourish under very unfavorable conditions, but under good cultivation its flowers are improved in size and colour. This species will do fairly well under cool treatment, and also in the stove. We do not think, however, that the extreme in either case suits it. It enjoys warmth at a certain season of the year, and is afterwards content with greenhouse treatment. After blooming in the conservatory for some weeks it will be quite at home in a vinery where a temperature of about 50° at night is maintained. The atmosphere suitable to the Vine is also suitable to this Cypripedium, and the plants can remain in the vinery if required until growth is completed; they are then kept in a temperature not exceeding 50°, otherwise they may flower too early in the autumn, and before they are wanted.

Cypripediums should be potted as soon as growth has commenced, the pots or pans being well drained, as the plants require liberal applications of water while growing, and in no stage should they be kept so dry as many Orchids are, not even while at rest. The compost should consist of sphagnum moss, good fibrous peat, charcoal, or broken potsherds, and sand well mixed. Some growers use loam, which we do not like, as it becomes sour too soon. Cow dung in a dry flaked state is also appreciated by C. insigne; it should be placed on the top of the mixture after potting, and just before the final mossing on the surface. We do not like the cow dung mixed with the compost for the same reason that we object to loam. It is not necessary to repot every year if the drainage remains good, and the compost such as will not quickly become sour. The cow dung on the surface can be taken off annually and renewed. Should any of the plants at potting time be found in bad health, which is at once perceptible by the yellow sickly appearance of the foliage, the soil has probably become sour. They should then be turned out, and the old compost picked carefully from amongst the roots. If any roots are found clinging to the sides of the pot it is best to break the pot and leave the portions to which the roots are clinging instead of injuring them. This done the roots should be washed in tepid water, and be allowed to thoroughly drain before repotting. When a plant is in an unsatisfactory condition it is not wise to strictly adhere to the compost named, but employ fully three parts of crocks and charcoal until the plant makes fresh roots and attains a healthy vigorous condition. During summer the plants may be grown in a greenhouse, shading them from strong sun, where they may remain until their flower spikes appear. Under this treatment during summer they bloom more profusely than when subjected to heat through the whole year. The flowers remain fresh nearly twice as long in the conservatory, or other house having a temperature of about 48°, as they would in stove heat; they also last a long time in a cut state. The varieties of C. insigne vary considerably; some are much finer than others, having half to three-quarters of an inch of white on the dorsal sepal, and beautifully spotted with small purple spots, while other varieties only possess a small margin of white on the sepal.

Cypripedium venustum will be found a good companion to the above; its flowers are much smaller, and are useful for cutting. It forms a good succession to C. insigne, and the same treatment will suit it well. It is a fine dark-leaved species, purple underneath, and its foliage renders it attractive when not in flower.

Cœlogyne cristata is a charming Orchid and popular with all growers. No garden where choice white flowers are in demand through January, February, and March should be without a few plants. The greater portion of the flower is white with a blotch of yellow on the tip. It is not difficult to grow; it is an evergreen plant, and its growth is made after flowering. The flowers last nearly five weeks if not in too much heat and kept free from damp. The plants will succeed on blocks or in pans. When on blocks much more attention is necessary as regards water; therefore we prefer them grown in pans. The compost should consist of chopped sphagnum moss, peat, sand, and plenty of broken potsherds. The drainage must be abundant, the pans being half filled with crocks, as liberal supplies of water are necessary during the period of growth. This species can be grown well in an ordinary plant stove where the temperature is between 55° and 60° at night, with the usual rise in the day. It enjoys a good rest, and its fleshy pseudobulbs allow of it being kept tolerably dry at the roots, and it is much benefited

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by being placed in cooler quarters after growth is completed, but should not be in a lower temperature than 45° or 48° It is necessary while the plant is making its growth to shade from the sun, yet in the declining months of the year after the growth becomes somewhat ripe it should be gradually exposed to more light and a cooler atmosphere. If any plants are unhealthy they should be turned out of their pots, the roots washed, and then placed on blocks with a little moss, and suspended from the roof of a house where a temperature of about 60° is maintained. They will soon make fresh roots, and when sufficiently recruited can again be placed in pans.—*Journal of Horticulture.*

RAISING THE ROOTS OF TREES.*

This is a subject deserving of much greater attention than has commonly been bestowed upon it by gardeners and others studying fruit cultivation, especially in this northern section of the kingdom, where our summers are short and the sun's rays of insufficient duration to penetrate deep enough into the earth to raise its heat into a healthy growing temperature, so as to enable fruits which are natives of a warmer climate to attain so perfect a state of ripeness, or to equal in flavour those grown in a southern latitude and under more favourable conditions.

By carefully studying the natural root-ramblings of all kinds of trees, it will not be difficult to comprehend that in most classes of fruits where the trees have been for some length of time planted and their roots well established in the ground, there must be a considerable portion which have penetrated too deep, or too far from the surface, so as to be out of the influence of solar heat, whatever may be the texture and character of soil in which they are growing. Of course those that are in a soil of rich alluvial formation and resting on a dry bottom will be in much better condition than others situated on a stiff clay with a subsoil of a cold inactive nature. Although trees planted in such situations, and under corresponding circumstances to the above, will continue to make growth freely, and even assume a healthy looking character, the wood, at th completion of the season's growth, is generally soft and spongy, and the fruit-buds, if formed at all, are invariably weak and imperfect.

As it is principally on the thorough maturation of the wood and buds that all successfull fruit cultivation hinges, it is therefore of the utmost importance that gardeners should acquire a perfect knowledge of the condition of the roots of the trees, the description of the soil in which they are growing, with the character of the subsoil, whether wet or dry, in which it rests—as no amount of heat, either natural or artificial, will enable the circulating fluids to produce firm, well-ripened wood, while the roots are absorbing crude unhealthy nutriment.

The injurious effects of over-deep root-action having so far been exposed, it may now be as well, before explaining the method of operation, to mention that the process may be performed at any season, although the leafless and dormant one is most to be recommended both as regards the convenience of setting about it in regard to labour and the ground being out of cropping. A digression, however, from the season above recommended was set about and successfully accomplished under my own superintendence many years ago while living in the South of England. Two Althorp Crassane Pear trees had been showing signs of their roots being too deep and of having reached the chalk which formed the subsoil, by the yellow hue which their leaves assumed. The border being out of cropping, and not being particularly busy at the time, operations to raise their roots were commenced about the middle of July by covering the whole of the tree first with mats, leaving the young growth of a foot to 18 inches in length untouched. The work of lifting and relaying the roots was done as speedily as possible by as many hands as could conveniently get at it, and copious waterings were immediately given to the relaid roots as soon as the earth was levelled in, while the foliage was syringed all over three or four times every day for about a fortnight. The young rootlets were soon forced into action, and the covering of mats which had been on day and night for about a fortnight was removed and the summer shoots shortened. The object of these being left until this time was to assist in bringing forward a quicker root action than would otherwise have been obtainted. The work at all events was so successfully accomplished that fruit-buds got well matured during the autumn, and a fair crop of fruit was gathered the following year.

Trees of unlimited size may be root-lifted by doing the work, as it were, by instalments—taking a fourth, a third, or one-half at a time. The largest undertaken by myself, was a Jargonelle Pear, covering a wall 14 feet in height by 73 feet in length. It was operated upon by preparing the roots the previous spring by cutting a trench along one-half of the border on which the roots were intended to be raised. This work was afterwards performed during the winter, and the remaining portion was acted upon in a precisely similar manner two years after. Large and vigorous as the tree was, scarcely any check was preceptible, through allowing the roots on one side to get well established before taking the other in hand. In commencing root-lifting it is well to have a quantity of fresh loam at hand, so that no delay may take place while the roots are exposed.

When the trees have been selected for operating upon, a trench should be cut all round as near the extremities of the roots as may be considered safe for the age and size of the tree. In the case of those growing against walls and on borders which are in proportion to their height, it will generally be found sufficiently distant from the stem to open the trench close to the walk. As soon as the opening is taken out to the depth of 2½ feet all round, or to the subsoil if less, the surface within the radius should next be taken off as deep as the roots will admit with the spade, and put aside by itself, for on account of its being enriched by frequent applications of manure it is well-suited to put around the roots when relaid along with fresh loam. The next process is to relieve thef roots from the soil, by forking it gently all round the edges of the trench, taking special care to save all the small fibres. The soil at the bottom ot the trench must be thrown back by a spade or shovel in order to keep i entirely clear of the roots. As the work progresses, and the numbers of roots as they are relieved become troublesome, a few strong pegs thrust into the soil will keep them aside, so as to allow the work to be performed with more freedom. Mats or straw will be found necessary to cover over the exposed roots at night. and if any of the soil is of inferior quality or considered exhausted, it should be put aside as the work goes on. In ordinary cases, where the trees are healthy, this will not be required.

As soon as the roots have been all laid bare, the soil must be again thrown back and all properly levelled. A good coating of fresh loam, in addition to about half of the surface previously put aside, should make up the border to about the proper level for relaying the roots, which, as a rule, should be so near to the surface as just to be clear of the spade. Wherever the roots are numerous it is better not to spread them all out at once, but it should be done in two or more sections, covering each division with a layer of fresh soil before putting down the next. When the roots have all been relaid, and a covering of 2 or 3 inches of soil put on over them, a good coating of well rotted manure spread over all before filling in the remainder of the soil and finishing off the border, will produce good effects by assisting to encourage the roots into growth, and likewise induce them to keep towards the surface.

It is thought proper here to state that the advice given as above is no theoretical promulgation, but is given from information attained by long experience and extensive practice. Most of the different kinds of wall fruit, with the exception of Cherries, which have few fibres and are dif-

* A paper "On Raising the Roots of Fruit Trees, as a means of inducing fertility, with fruit of finer quality and higher flavour," read by Mr. Webster, Gordon Castle, before the Scottish Horticultural Association

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ficult to manage, have been root-raised under my superintendence in the gardens here. I have therefore much confidence in strenuously advocating the principle of root-raising to fruit cultivators: and I also feel convinced that, wherever the plain is adopted, the labour and expense connected therewith will be amply rapid.

LONDON OFFICE

OF

THE INDIAN GARDENER,

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EAST INDIA AGENTS,

1, Whitefriars Street, London, E. C.

Correspondence.

THE EDITOR, "INDIAN GARDENER."

DEAR SIR,—Will you or any of your numerous readers, kindly let me know through this medium, whether there is any means of destroying the earthworms and other similar pests that infest many garden paths, sending up mud, making mounds or mole-hills every morning on the surface, thus marring the beauty of the paths laid with either gravel or brickdust.

Yours faithfully,

M. L N.

NOTE.—We have frequently heard of mole-hills having been made into mountains, but this is the first time in our experience that worm casts have been elevated into mole-hills. Were we in our correspondent's place we should certainly allow these wonderful curiosities to remain undisturbed; but if he is determined to destroy the worms, the following will be found effectual: 1 lb. fresh lime and 2 lbs. common salt dissolved in 4 gallons of water; this should be applied in the evening.—ED., *I. G.*

Rangoon, 26th February, 1886.

THE EDITOR, "INDIAN GARDENER."

DEAR SIR,—I shall be glad of your opinion on the proper management of a "Marechal Neil" Rose I have in the ground. It was planted last year, and has grown very freely, covering a large amount of wall space. Unfortunately I was absent at the pruning season, and consequently plenty of new wood has appeared, but few flowers and of poor quality. Do you think it advisable to trim it at the end of the hot weather and again in November next. The soil is very old stable manure and black earth with a proportion of charcoal, and for liquid manure I use half cow and half horse dung. Perhaps the free growth of the Rose has exhausted the soil. Could you also tell me if Hyacinths and such like bulbs flourish well in the plains in India.

Yours faithfully,

J. R. B.

NOTE.—We should certainly advise our correspondent to let well alone. According to his own showing the plant in question is in a flourishing condition. Free growth is all we ought to look for—during the first, and frequently the second year, after planting Roses of such a vigorous habit as Marechal Neil is in this country. There is no probability of the soil being exhausted as he imagines; if such were the case, the first sign of weakness would be in the foliage. The only change in treatment that we would recommend is to use cow-dung only as a liquid manure; except in very rare cases, horse-dung is not suited for this purpose in our climate. J. R. B. should not prune till after the rainy season, and then sparingly thin out all weak useless wood and cut back all the strong growths about 18 inches; this will encourage a free growth of lateral shoots that will bloom freely.

With care, Hyacinths may be grown with success. We have had a succession of plants in bloom for upwards of a month. For their cultivation see No. IV. Vol. II.—ED., *I. G.*

Cumballa Hill, Bombay, 17th Feb. 1886.

SIR,—My Eucharis Lilies are flowering with unusual abundance this year, and among the flowers I have had two double ones, with five sepals, five petals, and ten stamens each. It is clear this is an accident, as the double flowers were on different plants, and in each case it was only one flower out of six in a head that was double. Can you inform me whether it is an accident of frequent occurrence, and whether there are any means by which its repetition can be ensured? It never occurred before in my plants, and as they never seed, it is not possible to secure a progeny of double flowering plants from seed.

Yours, &c,

W. E. HART.

NOTE.—The peculiarity described above is occasionally met with when plants are in a vigorous state. We have had three or four instances of the kind in our own collection this season, and succeeded in fertilising two of the blooms with pollen from *Eucharis Sanderi*, and also made a reciprocal cross with the latter variety for the female parent fertilised with pollen from the double flowers. The seed pods are still on the plants, and from their appearance we have every hope that the seed will prove perfect. As to whether either of the crosses will perpetuate the peculiarity, it is impossible to predict, but it is certainly most improbable. —ED., *I. G.*

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to, should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

THE COLOURING MATTER OF FLOWERS AND FRUITS.

In an interesting communication on the subject of the colouring matters in flowers and fruits, contributed to a Society at Wurzburg (*Gardeners' Chronicle*, June 20) Dr. A. Hansen gives reasons for supposing that a relatively small number of pigments suffice for the production of the apparently endless variety of fruits. Taking flowers in the first instance and setting aside chlorophyl green, as being rarely met with in them, he recognises three groups of colours—the yellows, the reds and the blues and violets. White is due merely to the reflection of light through colourless tissues containing air, and blacks are attributed to a concentration of violet pigments; the yellow pigments are mostly in combination with plasmic substance, while the reds and blues and violets are generally found in the cell sap. The yellow in flowers is said to form an insoluble compound with fatty matters, which it is thought might explain the comparative permanence of that colour in plants. The pigments of different yellow flowers have been found to agree with each other in regard to their spectra so closely as to point to identity, and Dr. Hansen obtained by saponification with soda and extraction with light petroleum spirit a crystalline yellow pigment which corresponded in its behaviour to the "lipochrome" obtained by Krukenberg from the animal kingdom.

Orange is due to a denser deposits of the yellow pigment, the colour in orange rind being referable to the same substance as that in the petals of *Ranunculus repens*. The pigment in yellow Dahlias and lemon rind however behaves differently both chemically and spectroscopically; it is soluble in water, and seems to be very similar to the pigment of *Æthalium Septicum*, the yellow fungus or mould of rotten wood. The reds of flowers Dr. Hansen reduces to a single pigment, the description of which, so far as it goes, appears to correspond to that given some years since by Mr. Harold Senier of a colouring matter isolated by him from the petals of *Rosa Gallica*.—*Scientific American.*

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VITALITY OF SEEDS.

With very few exceptions all seeds retain their germinating power for at least a year under ordinary conditions; and, when placed in circumstances specially favourable, they remain fresh for a very lengthened period Several remarkable instances of this have already been mentioned, but cases even more remarkable than these are recorded In the ground, when buried deeply, the length of time seeds will retain life is indefinate —according to some authorities even unlimited. The accounts of seeds which had been taken from ancient Egyptian tombs germinating on being placed under favourable conditions, and other similar cases of an astonishing nature, might be mentioned. These are, however, of little or no practical moment beyond showing us how wonderfully tenacious of life is the tiny germ which lies enclosed in its often thin and delicate wrappers. How long a seed will remain good when placed under the conditions supplied in the seed-house, or when sown and treated for germination, is a question to which we may turn for more useful information. A seed when properly matured and kept dry in an even and suitable temperature, will remain healthy for a more or less lengthened period, according to whether it is oily or starchy, or whether it belongs to the exalbuminous kinds. Oily seeds usually perish in a comparatively short time, so that it becomes necessary to sow them as soon as possible after they are ripe; such seeds are those of Tea, Coffee, Camellia, Theobroma, Acorns, Brazil-nuts, Walnuts, &c. Seeds of a starchy nature are generally much longre lived. It is, however, impossible to draw a hard-and-fast line between long-lived and short-lived seeds, as there are so many conditions other than those we perceive, and often altogether beyond our control, which affect the vitality of seeds. Lindley says:—Seeds are probably possessed of different powers of life, some preserving their vital principle through centuries of time, while others have but an ephemeral existence under any circumstances. The reasons for this difference are unknown to us." In the case of many of our most popular and long-cultivated plants however, we have data sufficient to enable us to perceive how long their seeds may be expected to remain capable of germinating. The following list was prepared by the well-known seed merchants Vilmorin-Andrieux & Co., of Paris, and with it is incorporated a portion of a list printed in Burbridge's *Propagation and Improvement of Plants*:—

AVERAGE DURATION OF THE GERMINATING POWER OF THE SEEDS OF SOME CULTIVATED PLANTS.

	Years.		Years.
Acacia	many	Lentil	3
Alder	1	Lettuce	5
Amaranth	5	Maize	2
Angelica	1	Mallow	5
Anise	3	Marjoram	2
Artichoke	5	Melon	5
Aster, China	1	Mustard	5
Asparagus	4	Nasturtium ...	5
Balsam	many	Onion	2
Basil	6	Parsley	3
Beans, Broad	6	Parsnip	2
Beans, Kidney	3	Peas	4—5
Beetroot	5	Potato	4
Borage	3	Purslane	8
Burnet	2	Radish	5
Cabbage	5	Rampion	5
Capsicum	4	Rhubarb	3
Caraway	2	Rocket	2
Cardoon	7	Rosemary	4
Carrot	4	Salsify	3
Chervil	2	Savory	2
„ Tuberous	1	Scorzonera	2
Chicory	8	Seakale	3
Corn Salad	5	Sorrel	2
Cress	5	Spinach	5
Cucumber	5	Strawberry ...	8
Egg Plant	7	Thyme	2—3
Endive	9	Tomato	5
Leek	2	Turnip	5

The above table does not profess to give in every case the longsat time possible for the seeds to remain good, but only the average time during which, under the conditions supplied in an ordinary seed-room, they might be expected to retain their power to vegetate. Cabbage seeds have been known to germinate after being kept for ten years, and Kidney Beans after five years. As above stated, the conditions which affect the duration of life in seeds are too often beyond control, or altogether hidden from us.

It has been already pointed out that under certain conditions some seeds will remain dormant in the ground for a long time without losing their vitality; in like manner seeds will sometimes lie for years without commencing to grow, even when the conditions under which they are placed are what we consider favourable to germination. Lindley mentions various instances of this, all tending to show how necessary it is to have patience in the management of seeds, and more especially when the age of the seeds is unknown. Old seeds always germinate more slowly than young ones; the hardening of the testa or seed-coats through long exposure, no doubt, accounting to some extent for their tardiness in starting. By steeping in warm water or by removing the outer shell from seeds, germination, as shown above, is much forwarded. Fruits of Hawthorns, Hollies, Birch and other hardy berry-bearing trees are generally subjected to a softening process before their seeds are sown. This process is what is termed the "rot-heap," and is managed as follows:—The fruits are gathered in the autumn as soon as ripe, and are thrown in heaps, a quantity of sand, ashes, or light soil is mixed up with them by frequently turning them, they are then buried in a pit, or placed in heaps and covered with turf, where they remain till the following spring. The whole is then separated for sowing by partly drying and then sifting. In this manner the seeds are separated, whilst the warmth and moisture in which they were stored through the winter has softened the hard shell of the seeds, and, no doubt, has excited the germinative process.

Seeds of plants belonging to the Ranunculus and Primrose families, sometimes remain in the ground for several years without moving. Mr. Anderson-Henry states that some seeds of Ranunculus Lyalli, the Shepherd's Lily, sown by him in 1878, did not germinate till 1881; and in the case of seeds of a second species of Ranunculus, germination took place four years-and-a-half afterwards. The same extraordinary slowness has often been observed in seeds sown at Kew. How far this slowness to vegetate may be considered as natural to the plants, or whether it is due to some untoward influence to which the seeds had been subjected, is not clear. Seeds of Ranunculus Lyalli vegetated in about eleven months at Kew. I suspect that with most of those plants the seeds of which usually remain in the soil a long time before growing, it would be better to sow the seeds immediately on ther becoming ripe. Mr. A. Henry found Primula japonica and Gentians slow to germinate, but when the seeds of these plants are gathered and sown as soon as ripe, they generally germinate in a few weeks. It is said that Colchicum-seeds generally take over two years to start into growth. It is always best to select the largest and heaviest seeds in all cases where robustness of growth is the first aim; smaller seeds being slower to get away, and containing less vital force than larger ones of the same kind. It is also supposed that large seeds retain life for a longer time than smaller ones do.— W. WATSON, in "Cassell's Popular Gardening."—*Gardener's Chronicle.*

JAPANESE MUSHROOM CULTURE.

One of the industries of Japan is the cultivation of Mushrooms, which are exported in large quantities from that country, and some interesting information respecting them is given by Mr. Robertson in his Report on the Trade of Kanagawa, lately issued. The best of the edible species of Mushrooms are known as "Matsutaké" and "Shii-take." The difficulties attendant on preserving the former kind almost exclude them from the market for export; for not only do they decompose very rapidly, but even when successfully dried are nearly tasteless, and thus useless in cookery.

The Shii-take species, however, have this peculiar excellence, that, though all but tasteless in their raw state, when they are dried they have an extremely fine flavour. The quantity that grows naturally on the decayed roots or cut stumps of the Shii Tree is not sufficient to meet the demand for them, consequently much skill has been brought to bear on their culti-

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vation, notably by cutting off the trunks of the Shil and other trees, and forcing the growth of the Mushroom on them. Different varieties of Oak are most in favour for the cultivation of the Mushroom, the tree known as the Shil giving, however, the best results. About the beginning of autumn the trunk, about 5 in. or 6 in. in diameter, is selected and cut up into lengths of 4 ft. or 5 ft.; each piece is then split down lengthwise into fours, and on the outer bark slight incisions are either made at once with a hatchet, or the cut logs are left till the following spring, and then deep wounds, 8 in. long, are incised on them. Assuming the first course to have been pursued, the logs, after having received several slight incisions, are placed in a wood or grove where they can receive the full benefit of the air and heat. In about three years they will be tolerably rotten in parts. After the more rotten parts are removed, they are placed against a rack in a slanting position, and about the middle of the ensuing spring the Mushrooms will come forth in abundance. They are then gathered. The logs are, however, still kept, and are submitted to the following process:—Every morning they are put in water, where they remain till afternoon, when they are taken out, laid lengthwise on the ground, and beaten with a mallet. They are then ranged on end in the same slanting position as before, and in two or three days Mushrooms will again make their appearance. When the logs are beaten so heavily that the wood swells Mushrooms are induced of a more than ordinarily large growth. If the logs be beaten gently, a great number of small-sized Mushrooms grow up in succession. In places where there is a scarcity of water, rain-water should be collected in tanks. There is yet another plan. The cut logs are buried in the earth, and in a year's time are dug out and beaten as above described. The Mushrooms thus grown are stored in a barn on shelves ranged along three sides, with braziers lighted under; afterwards they are placed in small boxes, the bottoms of which are lined either with straw or Bamboo mats; these boxes are then ranged on the shelves and all approaches carefully closed. An even degree of warmth is thus diffused. The boxes ranged on the upper and lower tiers are constantly changed, so that the contents of each are thoroughly dried. Another mode of drying is to string the Mushrooms on thin slips of Bamboo, which are piled together near the brazier; the heat is well kept in by inverting a closely-woven basket over them. Dried Mushrooms, which are much liked by the Chinese, and largely consumed by the Japanese, retain their flavour for a great length of time, and thus bear transport to any distance very well.—*The Garden*

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THE ENTERTAINMENT AT THE ZOOLOGICAL GARDENS IN AID OF THE COUNTESS OF DUFFERIN'S FUND.

THIS important event, which has given rise to much speculation during the past few days, is now a thing of the past, and although there may be differences of opinion as to the success of some of the other items on the large programme arranged for the entertainment, there can be none as to the success of the Flower Show, and yet, strange to say, if there was one point more than another in which a breakdown was expected it was this. Those who are supposed to be our most competent authorities on horticultural matters, almost unanimously declared that it would be a failure, and shaped their actions accordingly; and although it can scarcely be said that there was any active opposition to the scheme, still so much apathetic indifference was shown, not only by many interested in horticulture, but also by others more immediately connected with the fund for which the entertainment had been promoted, that the undoubted success of the Show is all the more gratifying to those connected with it. Fortunately for all concerned, the honorary management had been entrusted to a firm to whom the words failure or defeat are unknown, and it is to the indomitable energy and perseverance of their representative that the public are indebted for perhaps the grandest entertainment that has ever been held in India.

Flower Shows in Calcutta have always been held during the first ten or fifteen days of February, and there seems to be a prevalent opinion that to move outside this magic circle either earlier or later is to court defeat if not disaster, and it is probably on this account that so many were so firmly convinced that the Exhibition of Saturday last could not be brought to a successful issue. Now if this idea had any foundation in fact, what a farce gardening would become amongst us. Fancy that for only fifteen days in the year we have anything good enough in our gardens to appear in public, and the remaining 350 days must be devoted to rearing and nursing them in private. Horticulture would then be certainly in a more backward state than it is at the present time in this country. We think the Exhibition of Saturday last will go far to remove the mistaken impression that has existed on this point. Let us take the chief grounds on which an ignominious failure was predicted. On this matter we are perhaps in a better position to speak than any one else, for during the fortnight preceding the Show we interviewed almost every one in the city at all interested in horticulture. The first and most general complaint was, that there could not possibly be any Roses fit for competition. The next, that the season for Annuals had gone, and that it was hopeless to expect any competition in these classes. Then came another formidable bugbear—"the weather,"

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and this, according to many, would form our chief stumbling block ; for in the first place we were told that this would prevent any one sending in any good foliage or flowering plants—and worse than all, the heat would also be the means of preventing any large attendance of visitors. Here was a nice position for the management to be placed in, if there was any truth in the old saying that what every one says must be true. They stood bound by their announcement to hold a Flower Show—although according to public opinion there could be no cut Flowers, no Annuals, no Foliage Plants, no Flowering Plants, and lastly, no visitors. Many disinterested persons (?) strongly urged the abandonment of the idea in its incipient stage rather than allow it to culminate in a fiasco; and had the management been in the hands of a public committee, undoubtedly this course would have been adopted. Fortunately, however, such was not the case. The opposition and reverse criticisms no doubt did have a powerful effect, but directly opposite to that which was intended : we might even go further and say candidly that the success of the entertainment was in a great measure due to it.

We have said so much of what was expected beforehand ; let us now turn to results. These, we may premise, not only astonished the sceptics, but must have also most agreeably surprised those who had taken a more hopeful view of the project. Collectively the Show was undoubtedly the largest that has been seen in Calcutta for many years, and brought out not only a larger number of exhibitors but a more varied range of exhibits than we are accustomed to see in this country. The classes for Cut Flowers, contrary to every one's expectation, attracted a large number of competitors : the Roses were wonderfully good considering the season, though of course somewhat lacking both in size and substance as compared with blooms produced early in February. The two exhibits in classes 30 and 31 by Lady Lyall, Allahabad, each of which was awarded the first prize in its respective class, were of course the centre of attraction, the blooms being not only magnificent in size but of first rate quality, and looked remarkably fresh considering that they had borne a journey of upwards of 500 miles. The classes for 12 varieties of cut blooms of Verbenas, Phloxes, and Antirrhinums, and also for a collection of 50 varieties of Annuals each brought out several competitors, the flowers being remarkably fine, and materially added to the attraction of this section of the Show. This is the first time we believe that these classes have been included in any Show in this country ; and, considering the success they met with on this occasion, we have no doubt that many other subjects might be shown in the same way to advantage. It is much easier to exhibit a small stand of a dozen or more varieties of any particular species in cut blooms, than it is to send the same number of growing plants in pots a distance of several miles. Besides this, amateur gardeners rarely manage to cultivate Annuals with much success in pots, although they have little difficulty in doing so in the open ground. The class for Bulbous Plants was also a new feature, and proved to be a very attractive one, bringing out three first class exhibits ; the one to which the first prize was awarded contained upwards of fifty Amaryllis in flower, most of them new varieties ; several good Hyacinths in bloom, and also a dozen plants of the new Hyacinthus candicans in flower. This is the first time we believe it has appeared in public in this country ; and when better known should become extremely popular, being exceedingly beautiful, and very easy to grow. The next exhibit contained several very fine Lilium longiflorum, Amaryllis, &c. &c. The classes for Orchids did not bring out so strong a list of competitors as we anticipated ; this was probably owing to the fact that one of our leading nurserymen had held a private Orchid Show at his own establishment during the week previous. Annuals, contrary to the expectation of every one, were not only remarkably strong in numbers but excellent in quality. The splendid Petunias from the Eden Gardens and a group of Asters grown in the Zoological Gardens being especially admired.

The various classes for Foliage Plants, both in the amateur and nurserymen sections, were all well represented, and formed, of course, the main feature of the Show, occupying a range of tents upwards of 200 feet in length. It is very evident from the large number of entries that the Croton still has its admirers. Dracænas, Coleus, Ferns and Begonias were also in strong force. We looked in vain however for any sign that might enable us to determine what genera is likely to take the popular fancy in succession to the superannuated Croton. In the class for New and Rare Plants there were several good exhibits, the best of which were *Anuthurium Scherzerianum maximum* in bloom (a very difficult species to flower in this country), *Anthurium Kalbreyeri*, a new climbing species, and that very rare orchid *Grammatophyllum Elisii*. The class for a Seedling Foliage or Flowering Plant raised in this country by exhibitor brought out three competitors, the first prize being awarded to *Aralia Westi*, which is probably the first hybrid variety of this family raised in this country ; the second prize being given to a very fine seedling *Abutilon* with immense yellow flowers striated with crimson. Class XL for a carpet design in Flowers or growing Plants did not attract so much attention as was anticipated. Very liberal prizes were offered, and it was hoped that it would have induced many competitors to come forward. The idea is purely an American one, in which country this style of decoration is now extremely popular ; screens and curtains being also frequently made on the same principle. A detailed list of the successful competitors will be found in another page. From this it will be observed that the arrangement of the Schedule was made on the principles that we have so long advocated, that is, for Amateur and Public competitors to be divided into distinct sections ; and we may also state that the total value of the prizes awarded has been defrayed by voluntary subscriptions. When we first advocated these ideas in this journal they were received with much adverse criticism, one writer under the nom de plume of *Audi alteram partem*, in our issue of March 3, 1885, wrote as follows:—

"As to your proposal to divide the prizes into two sections, that is, one for amateurs and the other for nurserymen, this is all *bosh*! Such an arrangement would never work successfully, and would lead to the extinction of the Shows altogether. The same system and the same rules have answered very well for the last thirty years, and there is no reason why they should not continue to do so still. As to the idea of inviting public subscriptions, it is certainly a chimerical one, and I, for one, would like to know where or how we could raise even as large an amount as what is now offered by the Society in Prizes."

Well as this "chiel was amang us taking notes" on Saturday, we hope he is now convinced that neither the one idea was "bosh" nor the other a "chimerical one."

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The successful result, not only of the Flower Show but of the Fête generally, is a matter for congratulation to every one—to the management for the success that crowned their arduous labours; to the public for one of the most enjoyable entertainments ever held in India; to the many exhibitors for their successes, and to the gentlemen who acted as judges, a very onerous and frequently a very thankless task, but which in the present instance was carried out with a discrimination that left no room for discontent. In one solitary instance only did we hear the faintest murmur of dissatisfaction, and this was from an exhibitor who, as he gains more experience in the prize ring, will doubtless learn to bear defeat with greater equanimity. He should bear in mind the following lines of the Revd. S. Reynolds Hole on this subject:—

Who misses or who wins the prize
Go, lose or conquer as you can;
But if you fail, or if you rise,
Be each, pray God, a gentleman.

Editorial Notes.

THE KING OF THE PUMPKINS.—The heaviest Pumpkin (according to M. de Vos); presented at the Paris market in 1884 weighed 130 kilogrammes. Translated into English, this means that the gourd in question weighed about the same as twenty-eight legs of mutton of 10 lb. each.—*Gardeners' Chronicle.*

SOOT-WATER FOR PLANTS.—The London *Garden* says: "If you merely make a mixture of soot and water, you have a crude and dirty thing to deal with: and the right way is to put a bushel of soot into a well-made canvas bag, into which a heavy piece of old iron has previously been thrown as a sinker; then tie up the bag tightly and throw it into a tank or large butt of pure rain or river water. None of the crude carbon makes its escape; but you have all the ammonia and other essential component parts of the soot, which are really soluble; and, either for syringing or watering, it is of the utmost value."—*Popular Science News.*

COCOA.—Accounts from Surinam are very favourable respecting the Cocoa-Culture; even the young trees, planted only five years ago in the Districts of Surinam and Commewyne on abandoned sugar-fields, have surmounted the many difficulties, and promise a good crop. The one-year-old trees, on the contrary, are in a less favourable condition, owing mainly to insufficient sheltering against the heat of the sun, and are partially lost. Additional plantings of cocoa are constantly being continued. There is great scarcity of available manual labour, and this want is felt most severely in proportion, as the estates are farther from the capital.—*Indian Mercury.*

FOR decorative purposes single Dahlias are pre-eminently useful, their large, bold flowers standing up well above the foliage, defying both wind and rain far better than the double ones, as the rain cannot rest among the florets, and, being much lighter in structure, they bend to the wind, instead of breaking off, as is too often the case with the massive double varieties. As a rule, too, the single ones are more profuse blooming, flower earlier, and are appreciated by every one for cutting purposes. There is another advantage belonging to the single varieties: that bane to flower picking, the earwig, finds no hiding-place among the petals; whereas double flowers often contain this objectionable pest.

CONTINENTAL FORESTS.—Elsass and Lothringen (Alsace and Lorraine) have long been famous for their wealth in forests. According to the report issued by the Imperial Commissioners of Woods and Forests, the entire forest lands of the newly-acquired provinces represent a value of about twelve milliards of marks. No less than 460,573 hectares of these forest land are State property, and are estimated to be worth 500,000,000 marks, or £25,000,000 English. In the year 1876 the woods yielded an income of 6,944,000 marks to the Treasury. The report has a table of the average annual value of a hectare of forest in Continental countries. In Elsass-Lothringen it is reckoned at forty-three marks, in France twenty marks (25 francs), in Prussia at nineteen marks. The cost of administration is far higher in the latter country.

THE FLOWERING OF PLANTS.—Attention has been called to the relation of the colour of flowers to their date of flowering. Taking 909 species of British flora, 257 were found to have white flowers, 238 yellow, 144 red, 94 purple, 87 blue, the remainder being green and other colours. Of the blue flowers, 16 per cent. bloomed in April; 14 per cent. of the white flowers bloomed in the same month, but only 9 per cent. of the reds, the yellows being very close to the latter. It thus appeared that the blues were far ahead of the reds and yellows, the whites being intermediate, and the purples and greens came in between the blues and the reds. This indicates the existence of some general law which arranges the flowering of plants in the British flora according to the colours in the spectrum.

THE GREEK ORACLES AS METEOROLOGICAL OBSERVATORIES.—Dr. E. Dohlen, in an interesting lecture published in Berlin in 1872, entitled "Die Orakel," endeavours to show that the earliest demand for prophetic knowledge among an agricultural community related to weather, and that the chief oracles were those of Apollo, the sun god, while also the earth and the sea had their shrines. Many of the earliest responses referred directly to weather; and the earliest prophets, Tiresias and others, are said to have understood the language of birds, or, in other words, to have drawn prognostics from their flight. If once the character of an oracle had been established by successful forecasts of weather, it is easy to see that political and social problems would be referred to the same authority, and the experience of those in charge of the shrines would enable them to dictate counsel which would at least bear a safe construction for their own credit.

RORAIMA.—Mr. im Thurn, an Oxford graduate, who wrote such an interesting book on British Guiana two or three years ago, has been engaged in exploring the most mysterious spot in South America. About seven or eight years ago Mr. Barrington, a geologist and naturalist, made known to science the existence of an inaccessible bit of table-land, called Roraima. It was surrounded by precipitous cliffs, and, it was believed, would only be explored by balloon agency. The top was covered with forests, and naturalists have ever since been on the tiptoe of expectancy with regard to this possible fragment or outlier of a former geological epoch. There we might possibly meet with a portion of the miocene or pliocene fauna and flora—fossilised elsewhere—which had become stranded, as it were, on this American Arrarat! The secret was bound to be found out after this, and by an Englishman, too. Mr. im Thurn went back to Guiana, determined to scale Roraima, and he writes to say that, after one or two failures, he has succeeded. He found the top covered with shrubs (no trees), and he found a large number of new species of plants, but no strange or new animals. The top of the plateau is 12 miles by four, and its weather-worn surface plainly reveals its geological antiquity.—*Australasian.*

HORTICULTURE in America is enjoying a season of real progress. Fine country places are on the increase in numbers and are more beautiful than ever. Fine gardens are becoming objects of real interest to people of wealth. The consumption of fine fruits, flowers and vegetables rapidly increases from year to year. Exhibitions of garden products never before had so many admirers as during the past fall. Horticultural associations are more numerous, more energetic, more useful than ever before. Gardening literature, in books and periodicals, is more popular, no less than five journalistic claimants for favor having come before the public in the past few months. Verily, the world is moving gardenwards. May the temples of the garden gods be still more

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beautifully decorated. May fashion, charity, hygiene and good sense demand more and more liberally the products of garden and field for their varied uses. Then will the earth be better for all of mankind that dwell therein.

The gardener stands first among his fellow tillers of the soil. First in skill. First in utilisation of the soil. First in the returns from his labour. First in knowledge of plants. First in the use of the beautiful in Nature. His art always savors of the mysterious in its manipulations. The wonderful forms and characters in flowers and fruits that rise under his hand make him greater than the alchemist of old. Yet he is not all-wise. There is not one of us who may not learn much from the many meetings of horticulturists at this season, and from the writings of specialists. Let us not draw within ourselves like tortles. No man begins to be wise until he sees the vastness of his own ignorance, especially in horticulture.—*American Garden.*

Insect Pests of India are thus noticed in the Proceedings of the Horticultural Society of India :—An interesting correspondence under the above heading was recently published in the *Journal* of the Society of Arts, at the request of the Secretary of State for India. The correspondence is too long for a place in these proceedings, but the following extract from Surgeon-General Edward Balfour's letter to the Secretary of State for India will convey an idea of the purport: "Although every year, to some extent, and from time to time largely, losses occur there from the pests which attack agricultural produce, India has hitherto been remiss in this matter, contenting itself with references as to individual insects or blights to such persons as were thought likely to be able to give information. But the subject is of far too great importance to Agricultural India to be left to be treated in so casual a manner, and the special knowledge now available might be utilized to describe the insects which injure the agricultural, horticultural and forest produce of India, suggesting means of preventing, and remedies for the same." Miss Ormerod, who in England annually reports on the insects injurious to food crops, forest trees, and fruits, and the prevention of insect ravages, in writing to Surgeon-General Balfour, warmly approves of his suggestion, and remarks :—"The information that is needed could be given by plain and simple putting down by various persons of what they themselves have observed, and one man notices, perhaps, how deep the grubs go; another how long they live; and so by collating the facts, we get to know the whole history of habits, which is what is needed to work on. It may take a few years to get the whole life history of the insects, but we soon get in the way mentioned above (on which plan my own reports are formed) to learn the main points, and then all observers are requested to find the missing part of the history." The whole of the correspondence will be reprinted in the *Journal*. Members of the Society wishing to co-operate in the manner suggested in the above extract from Miss Ormerod's letter should send their names to the Secretary.

Watering Plants—This is a subject which has been treated of frequently in the Journal, but not too often if the importance of the operation is taken into consideration. Good potting is essential to success, but carelessness in the application of water will quickly nullify the benefits of perfect potting. Too much and too little are the extremes to guard against. Supposing anyone to be growing four dozen plants; all may be watered rightly until growth is satisfactory, then there comes a day when one of them is so dry that the pot in which it is growing sounds like an empty one if struck with the knuckles. This plant is permanently injured, the young roots which were forming fast to support the plant are dead, and although the man in charge may determine that nothing of the kind shall happen again to that particular plant, his good resolution is too late. Once dry is once too much. By-and-by another plant in the same batch may be subjected to the same ordeal, and so it goes on until nearly the whole of the plants are thrown into an unflourishing condition. There is no excuse for anyone who has the plants in charge, and can examine them twice daily. Staking and tying, and everything else connected with growing plants, are all of minor importance to watering. There is another side to the question which is equally important. Besides the possibility of giving too little there is also the chance of giving too much. Of the two evils it is difficult to say which is the greatest. Both are decidedly bad, and those who go to the one extreme generally practise the other; indeed a man who lets some of his plants become too dry generally makes up his mind, when reprimanded for it, to avoid the same thing again, and for a time he waters most assiduously—too much so in many cases, as giving large quantities of water when none is required, simply to make sure of the plant not becoming too dry, is a most improper way of watering. There is a happy medium easily found and followed, of keeping plants in a growing state without going to extremes, and we would advise all men who have plants to water to adhere to it. Surface dribblings have often been decried, and must be so now and always. Sham watering of every description are delusions of the worst form which will soon become apparent. Watering pots full of soil before they contain many roots is a common practice, and a decidedly bad one, as it is at that time that the soil is most liable to become sour, and if it gets into this state before the roots have taken possession they cannot be expected to do much good in it afterwards. When plants have abundance of roots, and the pots, beds, and borders are well filled with them, it is more difficult to do harm with the watering pot than when few roots are there; but printed rules cannot be taken as invariable guides, but much can be accomplished by what one of your esteemed correspondents would call "thinking."—A. K. G.—*Journal of Horticulture.*

Original Articles.

THE ROSE.

Catalogue Descriptions.

In the selection of varieties there is perhaps nothing more puzzling to the inexperienced amateur than the descriptions given in Rose Catalogues. In some instances the multiplicity of technical terms employed are frequently sufficient to confuse even our oldest veterans, not that we would imply that these descriptions are necessarily overdrawn—on the contrary, we believe that the catalogues of the leading English Rosarians are amongst the most straightforward of what may be termed "trade literature," only of course they describe each variety at its best stage and grown to the best advantage. We wish we could say as much for the descriptions given by French raisers of new Roses. From our own experience of this class, we should say on no account purchase any of their novelties until they have passed through the hands of some reliable English grower and have been favorably recommended by him.

Mr. W. Paul in "The Rose Garden" gives a very exhaustive summary of the many terms employed in describing varieties. As this valuable work is probably in the hands of but very few of our readers, we give them *in extenso* :—"The first terms which present themselves are those relating to *the size of the flowers* : they are *five*, namely :—

Very small,	applied	when	the flowers	are	about 1	inch in diameter
Small	"	"	"	from	1½ to 2	"
Of medium size,	"	"	"	"	2 " 3	"
Large	"	"	"	"	3 " 4	"
Very large	"	"	"	"	4 " 5	"

There are also five terms used expressive of *the degree of fulness* :—*Single, Semi-double, Double, Very Double, and Full.*

The Single are such as possess but one row of petals.

The Semi-double have from two to five rows of petals.

The Double have more than five rows of petals, yet when full blown usually show the stamens in the centre of the flower. Examples :—General Jacqueminot (Hybrid Perpetual), Safrano (Tea-scented).

The Very Double have sufficient number of petals to hide the central stamens.

The Full have the petals closely together. Example :—Countess de Chabrillant (Hybrid-Perpetual), Marechal Niel (Tea-scented).

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It should however be stated that the flowers of some varieties vary at times and under certain conditions as to fulness.

In reference to the *form of the flowers* we have the terms *globular, cupped, compact, and expanded.*

The term *globular* is applied to such varieties as assume that form in which the outer petals encircle the flower, the latter remaining closed or almost closed until nearly full blown; thus the flower in its early stage is a perfect globe. Examples of this term:—The Cabbage Rose (Provence), La Reine (Hybrid-Perpetual), Gloire de Dijon (Tea-scented). It is worthy of remark that Roses of this form usually remain perfect for a longer period than others.

The term *cupped* is applied in cases where the outer petals of the flower stand erect or are slightly incurved, the petals within being in general of smaller size than the outer ones, the flower thus being a little hollow in the centre like a cup. Examples of this term:—Auguste Mie, Beauty of Waltham, Louise Peyrouny (Hybrid-Perpetuals).

The term *compact* is applied to those varieties whose petals are stiff and upright, the centre of the flower being almost level with its circumference, usually rising above it rather than being depressed. Examples of this term:—De. Meaux (Moss), Madame Boll (Hybrid-Perpetual.)

The *expanded* differ from the *compact* in this respect—the outer petals instead of standing erect, lie almost horizontal, usually turning back upon the flower stalks in the last stage of the flower. Examples:—Barrone Prevost, Geant de Batelles, (Hybrid-Perpetuals). These are the terms which I have thought it expedient to make use of, to convey a correct idea of the size, form and fulness of the different varieties of the Rose.

With regard to the form of the flower, it may be remarked that it often varies as the flower passes through its various stages of existence. Thus Roses which are globular when young frequently pass into the cupped state as they advance in age, a Rose which is cupped when half-blown may become compact when full blown; and a Rose that is compact in the former stage, may become expanded in the latter; and the same with regard to colour, a Rose may be pink or rose-colour when first opening to the sun and fade to blush ere it decay. Now with regard to form, as it would be difficult in all cases to record such peculiarities. I have contented myself with seeking out the most perfect stage of the flower and noting the form of such. As to colour, where this changes it will be found noted in the description.

The *habit of the plant* is the next character which presents itself. The terms used are—*branching, erect, dwarf and pendulous*

By *branching* I intend to point out the varieties whose shoots have a somewhat lateral tendency of growth, branching away from the centre of the plant.

Erect is applied to those whose shoots rise perpendicular, or nearly so.

Dwarf is applied to those of humble growth.

Pendulous is used to point out those that are of a pendulous or drooping habit.

There are four terms used illustrative of the *rate of growth*:—*vigorous, robust, moderate and small.*

Vigorous is used to point out such varieties as form long shoots.

Robust alludes to those which form very stout shoots of less length than "vigorous."

Moderate alludes to those which are of moderate growth: such usually form neat and compact bushes.

Small is applied where any variety is of small or dwarf growth.

To know the rate of growth of a plant is of the highest importance in the selection of varieties. How otherwise can they be properly adapted for particular purposes? How else arranged correctly in Rose clumps or in the formation of a Rosarium. One cannot always judge correctly of the rate of growth by a young plant, its vigour may be extraordinary, when in reality the variety is only a moderate grower. Hence it frequently happens that we find Roses in clumps and elsewhere badly placed, the guiding line when planting having been the rate of growth of the young plants, and thus a moderate grower fills a position suited only for a robust and vigorous one or *vice versa.*

NEW PLANTS OF 1885.

In dealing with these, we will begin with the group which is numerically the strongest, and that is the Orchids, of which more than sixty received during the past year first-class certificates. Passing over such plants as Cattleya Mendeli carminata, Mendeli striata, Blunti, Wageneri, Hardyana, and Massangeana, Dendrobium crassinode album, crystallinum album, Falconeri delicatum, heterocarpum album, nobile nobilius, and insigne, besides many others which, although handsome, are simply accidental forms of well known species, we note among imported Orchids in the first place the charming Cattleya Bowringiana. This plant, which is most valuable on account of its flowering at the dullest season of the year, at first sight somewhat resembles the popular C. Skinneri, but besides the latter being essentially a summer flowering species, this new-comer possesses characters by which it is easily distinguished; its pseudo-bulbs, which are altogether more robust than those of C. Skinneri, are enlarged and flattened at the base and covered with sheaths of a very peculiar texture; its leaves are also of a glaucous and entirely different tint from those of that well-known species. Its flowers, which are produced during October and November, are arranged in bunches, each consisting of from six to nine flowers, even in the case of plants of recent importation; their sepals and petals are of a mauve-tinted rose, while the lip is dark rich crimson and the throat is ornamented with a yellow stain. This new species is destined to become rapidly popular. Among other Cattleyas, C. Schofieldiana, if not the most attractive, is probably one of the most distinct. It belongs to the tall, terete pseudo-bulb section. Its flowers, which are produced in bunches of three or four together, are of intermediate size, measuring from 3½ inches to 4 inches across; owing to their ground colour being olive-green and their sepals heavily blotched with brown, they form a striking contrast with the rich deep amethyst broad lip, deeply edged with white. Angræcum or Aeranthes Leonis, the first specimens of which were gathered by Mons. Léon Humblot, only reached Europe in April last. It is of smaller dimensions than most of the other Angræcums already in cultivation. Its stem, which is short and stout, is furnished with sword-shaped leaves disposed in a fan-like manner. Its flowers, which are of the purest white, deliciously scented, and long lasting, are produced on short wiry spikes; they have a broad white shell-like lip and a long and peculiarly twisted greenish-white spur. In Aerides Ballantinianum and A. Wilsonianum we have also two excellent additions to the East Indian house. The former is in the way of A. suavissimum, which it resembles in growth, form and size of flower, but differs essentially from it in colour. Its blossoms, which are pendulous, vary from a very pale pink to a deep crimson, the tips of the sepals being of a more or less deep carmine and the spur yellow. A. Wilsonianum, which in growth bears a great resemblance to A. virens, has pure ivory-white flowers, disposed on pendulous spikes and, like the preceding, deliciously fragrant. Both these flower in May and June.

Three new Saccolabiums, two of which are absolutely distinct from anything else yet in cultivation, have also made their appearance. These are S. bellinum and S. cœleste, the former a sweetly pretty and exceedingly interesting Orchid. It is dwarf in growth, and has short leathery leaves, from the axils of which are produced short rigid flower-spikes, which, instead of errrying a quantity of blossoms, as is the case with all other Saccolabiums, only bear from six to ten, and which are somewhat of a different shape and much larger than usual; the colours are also distinct, the lip being broad and pure white and profusely spotted with deep carmine. Saccolabium cœleste is the best of the whole genus. It comes from Cochin-China, and is similar in habit to S. curvifolium, but its flowers, which are arranged regularly and closely on a short spike, at most only 4 inches long, are of the purest and most beautiful sky blue that one can imagine. This is seen to best advantage on the anterior part of the lip and on the tips of the sepals and petals, and a stripe of it runs on each side of the recurved spur; the anthers are of a peculiar brown tint shaded with mauve. Another Saccolabium well worth attention is a glorious white form of S. Biumei. Maxillaria Sanderiana is quite distinct from those already in cultivation; its flowers, which are very handsome,

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are of about the same dimensions as those of a good form of Lycaste Skinneri and triangular in outline; their thick sepals are ivory white, while their lower halves and two lateral petals are stained port-wine colour.

Among Orchids with thick fleshy flowers we must not overlook a couple of forms of the handsome Mormodes luxatum; the new variety punctatum is also particularly beautiful on account of its curiously shaped flowers, which are borne eight or ten together on a short stiff spike proceeding from the base of a short fleshy bulb, surmounted by long ribbed leaves; they measure about 2 inches across, and are creamy-white copiously spotted with numerous very fine spots of a chocolate-red colour. In the new Oncidium Brunleesianum we have one of the most distinct among lately introduced spring flowering Orchids; it is still, however, very rare, and its lovely blossoms, which are of a golden colour with dark brownish red lips, are so entirely different in shape from those of any other Oncidiums, that comparison is out of the question. Its bulb, which very much resembles that of O. sarcodes, produces a tall, branching panicle, very slender, which carries quite crowds of small flowers.

Amongst Odontoglossums special attention must be directed to O. crispum Brymerianum. This, besides being remarkable for the size and perfect form of its flowers, gives us also some beautiful and distinct markings on the broad sepals, each of which is ornamented inside by a large blotch of chestnut-brown, while outside they are flushed with purple. O. crispum Johnsonianum has its sepals entirely covered with cinnamon-red, edged with white. Of other Odontoglossums the most distinct are O. Wilckeanum Godefroyæ, an extremely handsome variety, different from all others; its sepals, which have a pale yellow ground, are almost entirely mottled with rich chestnut-brown spots. O. vexillarium Measuresianum is a perfectly white form of one of the best Orchids in cultivation. O. elegans Aliciæ, with long pointed pure white sepals irregularly spotted and blotched with cinnamon-red, is one of the prettiest of the lovely class of Orchids to which it belongs. Amongst many others belonging to different genera may be mentioned Renanthera Storeyi, a kind with flowers of a rich crimson-red, mottled and barred with bright orange-scarlet; the beautiful Stanhopea-like Acineta chrysantha, whose large orange-yellow flowers, spotted with very deep brown, and of a waxy texture, are endowed with a delightful fragrance; Calanthe Sanderiana, Dendrobium Burkei, &c., but those enumerated above are sufficient to show that, at least as far as Orchids are concerned, the supply of imported novelties is as plentiful as ever.

Hybrid Orchids.

Amongst home-raised varieties the most striking are the Cypripediums and the Calanthes. Of the former we have some half dozen excellent sorts, all raised by Mr. Seden; amongst them the most striking are undoubtedly C. œnanthum superbum, C. Schrœderæ, and C. Sedeni candidulum. The latter, which possesses both the habit and floriferousness of the popular C. Sedeni, may be best described as an exquisitely pretty pale form of it with sepals nearly white. C. Schrœderæ, the result of a cross between C. candatum and C. Sedeni, has flowers much larger than those of any other kinds belonging to that section, measuring, as they do, from the tip of the dorsal sepal to the toe of the slipper more than four inches. Besides the size of these flowers, from three to four of which are produced on a spike and open in succession, their colours are also very ornamental; the dorsal sepal is whitish, tinted with delicate rose, while the lower sepal is larger and whiter. The petals, however, which form the centre of attraction, are about 4 inches long, pendulous, elegantly twisted, and pale rose with longitudinal deep rose veins. It is, moreover, a perpetual flowerer; perhaps, however, the most brilliant of these seedlings as regards colour is C. œnanthum superbum, the result of a cross between C. Harrisianum and C. insigne Maulei. This is a plant of vigorous growth and one which produces large, solitary flowers, conspicuous for their lustrous varnished surface and uncommon colours. The dorsal sepal, which is of a deep claret-red with broad lines of blackish-purple spots, is further ornamented by a broad white margin, and where the spots enter it they assume a most beautiful mauve-purple tint. The petals are vinous-red with deeper veins, except at the base and at the apex where it shades off into pale green; the tip is of a deep vinous-red colour shaded with bright shining-brown. To the same raiser we are also indebted for the superb C. cardinale, C. macropterum, a hybrid between C. Lowi and C. superbiens and exactly intermediate between the two parents, and the lovely C. Leeanum superbum. Mr. Seden has also raised Cattleya Canhami, a magnificent cross between Lælia purpurata and C. Mossiæ, which latter it resembles in growth, but the general aspect of the flower is that of a fine form of Lælia purpurata alba, which it resembles in size and shape. The sepals are white, while the lip is large and of an intensely deep carmine-crimson with a conspicuous pure white margin, which forms the principal attraction of the flower. Then there are the two exquisite Lælias, bella and Sedeni, the former the result of a cross between Lælia purpurata and the autumn-flowering Cattleya labiata; in growth it is very similar to the last named species, although the features of the Lælia are perfectly distinguishable. The flower measures 6 inches across; its sepals are deep lilac-purple, and the lip rich crimson-amethyst, a colour which extends up the throat, while the margins are rendered particularly attractive by a very delicate pale mauve frilling. Lælia Sedeni is a magnificent variety, the colours of which, as regards brilliancy, are unsurpassed by those of any other belonging to the same genus. It is somewhat in the way of L. elegans, although its flowers, which are a little smaller, have their sepals narrower and shaped differently from those of that species; these are of a plum-purple colour, but the most attractive part is the lobe of the lip, which is of an intensely deep and brilliant carmine-magenta. In Masdevallia Gairiana we have one of the very few hybrids belonging to that section; it is the result of a cross between M. Veitchiana and M. Davisi, and is quite intermediate between those two species as regards shape and colour, which is orange-yellow washed with a purple tinge. Dendrobium endocharis is the result of intercrossing D. hetercarpum and D. japonicum. Its flowers are ivory-white except the lip, which is tinged with purple and deliciously fragrant. Thunia Veitchi is the first hybrid raised in that genus. It is the result of crossing the white T. Marshalli and the rosy-purple T. Bensonæ, and in point of colour is intermediate between these two; the sepals are of a delicate blush tint, and the lip is crested with bright yellow. The general habit of the new-comer is that of T. Marshalli. As to Calanthes, these being the work of several hybridisers, new varieties have been produced in greater quantities than in any other genus; and it must be admitted that some of them at least are possessed of truly grand colours, which are much needed at the season at which they usually flower. In December, 1884, a variety brighter, darker, and of altogether richer colours than those of any C. Veitchi known was shown by Sir Trevor Lawrence, under the name of Calanthe Sandhurstiana. That splendid variety, the result of a cross between Limatodes rosea and C. vestita rubra oculata, was raised by Mr. Gosse of Sandhurst, Torquay, and owing to the magnificent spike of rich rosy crimson flowers which the plant bore when shown it was acknowledged by all present to be thoroughly distinct and superior to any form of Cattleya previously obtained from seed. Other very pretty and distinct varieties are aurantiaca, casta, amabilis, and others; but one particularly handsome kind, certificated under the name of porphyrea, also came from Burford Lodge. Very fine hybrids were also shown by Mr. Cookson, Oakwood, Wylam-on-Tyne, and among them one variety, named C. Alexanderi, showed the same rosy-crimson tints as are seen in C. Sandhurstiana; another named C. Cooksoni, was much paler in colour, but equally distinct and beautiful.—*The Garden.*

(To be continued.)

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GRAND HORTICULTURAL FETE.

IN AID OF

THE COUNTESS OF DUFFERIN'S FUND.

Held at the Zoological Gardens, Alipore, on Saturday, March 20th, 1886.

PRIZE LIST.

—:o:—

Section I.—Growing Plants.

—:o:—

Amateur Classes.

No. of Class.		Amount of Prizes. First.	Second.	Awards. First.	Second.
1	Orchids, best 6 varieties in flower	... 10	5	Rai Prosono Comar Banerjee ...	Malee.
2	Roses in pots, 6 varieties	... 8	4	No award.	
3	Ferns, best 8 varieties	Silver Medal	6	Maharajah Cooch Behar ...	Malee.
4	Foliage Begonias, best 8 varieties ...	Silver Medal	6	Ditto	Ditto.
5	Panax and or Aralias, best 6 varieties ...	... 5	3	No award.	
6	Dracænas, best 8 varieties	... 10	5	Maharajah Cooch Behar.	
7	Crotons, best 12 well grown varieties ...	Silver Medal	6	Ditto	A. C. McFarlane, Esq.
8	Verbenas, best 6 varieties	... 5	3	Babu Radhica Prasaud Mukerji	Mrs. Fitzjames.
9	Phloxes, best 6 varieties	... 5	3	}	
10	Petunias, best 6 varieties	... 5	3	} No awards.	
11	Geraniums, best 8 varieties	... 5	3	}	
12	Foliage Plants, best 10 varieties ...	Silver Medal	6	Maharajah Cooch Behar ...	A. C. McFarlane, Esq.
13	Annuals, best collection of 24 varieties, to comprise not less than 6 distinct species	... 10	5	No award.	

Classes for Public Gardens and Nurserymen.

16	Ferns 12 varieties	Silver Medal	0	Empress Nursery	
18	Panax and or Aralias, 8 varieties ...	... 8	4	Eden Gardens	Calcutta Horticultural Company.
19	Dracænas, best 10 varieties ...	... 10	5	Empress Nursery	Belvedere.
20	Crotons, best 20 well grown varieties ...	Silver Medal	6	Ditto	Calcutta Horticultural Company.
21	Verbenas, best 8 varieties	... 7	4	Belvedere	Eden Gardens.
22	Phloxes, best 8 varieties	... 5	3	Eden Gardens	Belvedere.
23	Petunias, best 8 varieties	... 5	3	Ditto	Ditto.
24	Geraniums, best 6 varieties	... 5	3	Ditto	No award.
25	Foliage Plants, best 20 varieties ...	Silver Medal	6	Calcutta Horticultural Company	Empress Nursery.
26	Annuals, best collection of 24 varieties, to comprise not less than 6 distinct species	... 10	5	Eden Gardens	No award.

Open Classes.

The following were open to both classes of Competitors.

27	New or Rare Plants, best 6 varieties ...	Silver Medal	5	Calcutta Horticultural Company	Empress Nursery.
28	New or Rare Crotons, best 10 varieties ...	Silver Medal	5	Ditto	G. W. Bartlett, Esq.
29	The best collection of Bulbous Plants in Flower	Silver Medal	5	Ditto	Eden Gardens.

Section II.—Cut Flowers.

Amateur Classes.

30	Roses, best stand of 24 varieties ...	Silver Medal	6	Lady Lyall	Rai Prosono Comar Banerjee.
31	Roses, best stand of 12 varieties ...	... 6	4	Ditto	Ditto.

Classes for Public Gardens and Nurserymen.

32	Roses, best stand of 24 varieties ...	Silver Medal	6	Barrackpore Park	Belvedere.
33	Roses, best stand of 12 varieties ...	... 6	4	Belvedere	Barrackpore Park.

Open Classes.

The following were open to all Competitors.

34	Verbenas, best stand of 12 varieties ...	.. 5	3	Calcutta Horticultural Company	Eden Gardens.
35	Antirrhinums, best stand of 12 varieties...	... 5	3	Ditto	Ditto.
36	Phlox Drummondi, best stand of 12 varieties	... 5	3	Ditto	Ditto.
37	The best stand of Cut Annuals to comprise not less than 6 distinct species and fifty varieties	Silver Medal	5	Ditto	Belvedere.
Class XL.—Special Class for a Carpet Design in Living Plants or Cut Flowers, not to exceed three feet in diameter ; the subject for the design to be selected from the following :—The initials of her Excellency the Countess of Dufferin, The Royal Arms, Union Jack or Crown. **1st Prize.**—A valuable Gold Medal presented by Messrs. Thos. Cook & Son. **2nd Prize.**—1 Gold Mohur, presented by Messrs. Stanley Price & Co.				Ditto.	
Class XLI.—For the best collection of Plants and or Flowers, of any number of kinds. **1st Prize.**—Silver Medal. **2nd Prize.**—Rs. 5.				Ditto.	
Class XLII.—For the best Seedling Ornamental Foliage or Flowering Plant (Perennial) *bona fide* raised in India by the Exhibitor. **1st Prize.**—Silver Medal. **2nd Prize.**—Rs. 5.				Ditto	G. Bartlett, Esq.
Class XLIII. Best 12 varieties Coleus. **1st Prize.**—Rs. 6. **2nd Prize.**—Rs. 4.				G. W. Bartlett, Esq. ...	Maharajah of Cooch Behar.
Class XLIV. Best Specimen Orchid. **1st Prize.**—Rs. 8. **2nd Prize.**—Rs. 5.				A. C. McFarlane, Esq. ...	

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PLANT STIMULANTS.

An interesting question was the other day propounded: "What are plant stimulants?" Probably, not a few will at once say, "Oh! there are plenty of such, as, for instance, artificial manures—salts, soot, guano, &c." If we judge of these by their active results, we may say—perhaps not without truth—that they are stimulants, or, perhaps better still, that they stimulate. But, then, if so much be admitted, we must also materially change or modify our estimate of stimulants or their effects upon men and animals. Practically, with the latter we associate few stimulants. Perhaps, when we give poultry certain condiments to promote bodily heat, and thus assist or promote egg-production, or when we give to horses and other cattle certain condiments to produce sleekness of coat or promote extra appetite, we may be said to employ stimulants; but their use is not to be regarded in the same sense as the use of stimulants to plants, because we employ these so called at all times and under all sorts of conditions.

Again, with man—who is, perhaps, the greatest employer of stimulants—we find the use to be diverse, as fancy shall instigate or custom exact. We do not term ordinary food stimulants; the term is never fitly applied to anything which is really food and assimilates with the blood of the human body. With man a true stimulant is something which creates a certain effect for a certain purpose; bnt if that effect is not created, the stimulant is more harmful than otherwise. Man needs no kind of stimulants in health; indeed, their use may be the instrument of deranging health. It is when health is deranged, and the system is low or impoverished, that some kind of stimulus is needful and desirable; but only then that it may promote such action on the part of the assimilative organs of the body that real food shall be converted into nutriment, and thus help to create health, strength, and the constituents of the body. Thus, with the human family, stimulants are not food, but may be wisely employed to promote good digestion. Even in that case, however, the ordinary human being is far from being his best prescriber, or shall we say gardener, and it is very likely will imbibe stimulants not only when undesirable, but possibly of a kind that is rather harmful than healthful.

Now, it is hardly possible for us to deal with plants in that way. We can apply to them no form of stimulant that does not comprise actual good elements, with one exception, and that is warmth. Even then it is difficult to class heat with ordinary stimulants, because it is a natural product, and one of the essentials of plant life at some stage or other of its existence. Yet it is certain that artificial heat is a genuine stimulant; it is not food, and is applied under unnatural conditions. Had some earlier suggestions as to the application of the electric light to plant culture been adopted generally, we might, with equal good reason, have said that light might be termed a stimulant also; but, of course, it would be only when thus artificially applied. Practically, the only true stimulant applied to plants, and not found in the form of food, is artificial heat, because that produces a condition of atmosphere which is artificial, and hence plant life and activity is stimulated into growth, when without such application it would be at rest.

But of all the stimulating materials or elements as given to man or to animals, there are none which we can offer to plants in the expectation of producing healthful results. With these, apart from artificial heat, we can offer only food or real plant constituents in the form of ammonia or phosphates, or of some other gaseous compound, still further in the from of highly concentrated solid or liquid compounds—guano, superphosphates, nitrates, ammonia; indeed, one and all of these so-called stimulants are food, and really only valuable just as they contain more or less of assimilative food. Soot sown broadcast over Grass soon changes its hue and promotes growth, and because these results follow speedily the material is termed a stimulant. The term is only correct in so far that it has caused this change to occur quickly; but really the change has resulted from the fact that soot contains food elements which Grass can assimilate as speedily as the manure can part with it, and that it can do at once. Really, the same food constituents will be found in a heap of ordinary stable or in other animal manures, and in guanos, phosphates, &c., only in the latter case in a more highly concentrated form, and thus the sooner parted with. Bones, on the one hand, if roughly crushed, only prove to be a lasting and far from stimulating manure; but if subjected to a bath of sulphuric acid they become immediately soluble, and can be rapidly absorbed by plants; hence, in this changed condition, would be termed a stimulant, though really a food.

We give plants liquid manure and call it a stimulant, but it is really given to supply the lack of nutritious matter in the soil about the roots. If in any other form than as food, although thus materially liquified, the application would be harmful rather than beneficial. It is well we should have a clear appreciation of the forms of stimulants, partaken of by mankind and those we give to plants under that name. Man partakes of little which is food when he partakes of stimulants, whereas—with the exception of artificial warmth, as we have pointed out—plant stimulants can promote life and growth only as they are food and nothing else. The most ordinary stimulant employed by man is alcohol, and yet he rejects presently almost every particle of it, assimilating none. Plants never do that; they emit perfumes, but those are the products of plant chemistry, and not the stimulants absorbed and then emitted unchanged.—*Gardening World.*

LONDON OFFICE

OF

THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

1, Whitefriars Street, London, E. C.

Correspondence.

TO THE EDITOR "INDIAN GARDENER."

SIR,—Your correspondent M. L. N. has I fear never read "Darwin on Earthworms." Had he done so he surely would not be so anxious to destroy what he terms pests, but which, according to the above authority, are one of man's chief benefactors. At the time the work mentioned was first published the following lines appeared in *Punch*:—

I've despised you, old Worm, for I think you'll admit
That you never were beautiful even in youth;
I've impaled you on hooks, and not felt it a bit;
But all's changed now that Darwin has told us the truth
Of your diligent life, and endowed you with fame,
You begin to inspire me with kindly regard:
I have friends of my own, clever Worm, I could name,
Who have ne'er in their lives been at work half so hard.

It appears that we owe you our acres of soil,
That the garden could never exist without you
That from ages gone by you were patient in toil,
Till a Darwin revealed all the good that you do.

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Now you've turned with a vengeance, and all must confess
Your behaviour should make poor humanity squirm,
For there's many a man on this planet, I guess,
Who is not half so useful as you Mister Worm!

P. B.

FLOWER SHOWS.

To the Editor, "Indian Gardener."

Dear Sir,—I travelled the best part of a thousand miles last month chiefly to have a look at the Calcutta Flower Show.

I cannot say that the display presented to the view of a weary traveller was sufficient to recompense him for the long hours of jolting and the much broken up rest from "show your tickets please" that he had to endure before he was permitted to reach your glorious old city.

When I ventured to leave my snug wee corner in Liliumpore, bent on seeing, for once in my life, a Flower Show worthy of the name, I little though that a feeling of disappointment was to be my chief experience while wandering around among the crowd of spectators on that occasion. Of course there were many fine things exhibited; the Camellias were very lovely, and there were some rare and splendid Crotons and Ferns, but taken as a whole, and considering it was the production of the Presidency, I think it will generally be conceded that the display was far below what it might very easily have been.

I noticed particularly the almost entire absence of bulbous plants in flower; as far as I can remember that section was represented only by a few specimens of Narcissus, Amaryllis and a Lilium longiflorum; this is to be regretted, because well flowered bulbous and tuberous-rooted plants as a rule make a far richer display than annuals and such like. Many people suppose that bulb culture is difficult and results uncertain; I do not find it so, as the following plants now in full bloom in my garden will go to prove, viz., Antholyza, Anomotheca, Animone, Babiana, Begonia, Calla, Œthiopica, Eucharis, Geissorhiza, Gladiolus, Hyacinth, Iris, Ixia, Lachenalia,

Oxalis Alba
" Bowiei
" cernua
" esculenta
" easiandra
" purpurea
" rosea.
" versicolor

Philogyne, Ranunculus, Sparaxis in 12 named varieties, Triteleia, Tritonia and Zephyranthes. These are all growing in pots, and can be used to great advantage in decorating halls or carrying off high honors at flower shows. It is possible to have a succession of bulbous plants in flower throughout the whole year, and were it not for taking up too much of your space, I would like to give a list of them shewing the months in which different varieties bloom, but I will not encroach further at this time.

I think your Horticultural Show might be managed a good deal better, and a larger number of amateur gardeners induced to encourage it by exhibiting the best they have.

Yours truly,

Liliumpore,
16*th March* 1886. Jonquil.

Note.—We trust our correspondent will favor us with the list mentioned. We quite agree with him that bulb culture is deserving of more attention than it has hitherto received in this country.—Ed., *I. G.*

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to should be sent in not latter than the Friday previous to the day of publication. All communications should be written in one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

DECAY OF THE INDIAN SILK TRADE.

The *Pioneer* in a recent issue contained an article on this subject, the writer of which commences by showing that, though there is a market in India for the cheap filatures produced by the native method, the large companies which work to supply the European market cannot compete with China. He explains the reason for this, as follows:—

The difference between Indian and Chinese silk admits of a very simple statement. Silk yarn loses much of its weight in the process of dyeing, and of course the foreign manufacturer will turn by preference to that kind of silk which loses least. Now if we take the produce of the worm that feeds on the mulberry—the species which created the old historic silk industry of Bengal—a pound of Indian yarn yields 10½ ounces after dyeing, but a pound of Chinese yarn yields 11½ ounces: the difference is therefore 6 per cent in favour of the latter, and in point of strength also the superiority rests with the Chinese product. If we leave the mulberry silkworm and take the multivoltine tusser, which is found wild in many parts of India, and used to be reared extensively on trees in the open air in Chota Nagpur and other hill tracts of Bengal, as it is still reared in the Central Provinces, which abound in the hill and jungle that it most affects, a comparison of Indian tusser and China tusser is again to the disadvantage of the former. The Indian yarn returns half an ounce less after dyeing, and is thus 3 per cent to the bad; but its deficiency in strength is a more serious matter. Every silk-weaver knows how much the lustre of his fabric—the quality which gives it attractiveness in the eyes of the customer and enhances its price in the trade—depends upon the natural strength of the fibre. The beautiful sheen of silk is altogether an effect of nature; it comes of the light glancing along the straight lines of the fibres which lie side by side and compose the thread. Twist the fibres, and you destroy their even straightness, and the lustre disappears. But if the fibres are weak they must be twisted, or the thread will not be strong enough for weaving. Now this is the case with Indian tusser, and hence a deficiency of lustre in the woven fabric, and a depreciation of 3 or 4 per cent in its value when compared with the more brilliant Chinese. Again, this same want of strength shuts Indian tusser out of one half of its market. The thread is unfitted for setting in the loom lengthwise; it can only be used for weaving across the breadth of the piece, and thus the European weaver who works with Indian tusser has to choose some stronger silk for the groundwork of his web.

These are some of the reasons which account for the decline of the Bengal silk industry and the diminishing export of Indian silk generally. We are speaking now of what is technically known as *thrown* silk, that is, silk-yarn made by reeling the silk off the cocoon. It is a process in which machinery has no part, depending entirely upon the silkworm's work in the first instance, and next upon the delicacy of the human fingers that manipulate the fibres. A machine that could do this work would be worth a fortune, and indeed it is not likely that the problem of finding a substitute for young women's fingers will much longer continue to baffle the inventiveness of the age.

* * *

The fault of the Indian silkworm is that in spinning his fibre he never puts in a sufficiency of "bone." "Bone" means in the language of the trade, that hardness and firmness in the fibre which enables it to keep its even roundness through all the trials to which it is subjected in dyeing, combing, and weaving. If not duly fortified with "bone" the thread gets frayed at the edges, and becomes "flossy," and flossiness is a quality abhorred by the weaver. It is little differences like this which affect the prosperity of whole industries. The fortunes of the largest silk manufacturer in England have been built on a minute improvement in the process of combing, and the fortunes of Indian silk would revive if its fibre could by any means be hardened a little. It is hoped that this end may be attained by greater care

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in the breeding of the worm. The Bengal silkworm, it is well known, has long been steadily degenerating under the neglect and carelessness habitual to the natives of the country, whose only object is to raise a crop as rapidly as possible, with the least expenditure of money and trouble. Unfortunately reform in this respect is a matter of extreme difficulty. In the Punjab and in Dehra Dun no pains have been spared to teach the ryots how to rear silkworms, good seed has been distributed, and competition has been stimulated by exhibitions where the best collection of cocoons finds a liberal reward; but it has all proved vain, except indeed as a demonstration of the impossibility of getting the ryot to give that methodical attention to his silkworms without which the goodness of the stock cannot be maintained. An experiment that has failed among the livelier and keener peasantry of Upper India has but a poor chance of success, we fear, in lazy, listless, Bengal. Then comes the question whether it might not pay to undertake the breeding of one's own silkworms: and this, too, has been tried in the Punjab, where those beautiful yarns were produced which attracted so much admiration at the Calcutta Exhibition. But the old defect of the Indian breed still clings to it, and all the care bestowed upon the selection and rearing of the silkworms has failed to develop the essential quality of bone in sufficient strength. The last resource is to make an entirely fresh start with new seed imported from Japan. But the history of these experiments suggests a doubt whether the new strain will long preserve its vigour. The hereditary weakness of the Indian silkworm may, of course, be traceable entirely to a long course of reckless breedings, but it is perhaps more probable that the cause is a climatic one, and in that case we shall see the Japan stock gradually yield to the fatal influences of its new habitat, and part with the firmness of its fibre just as the European stock of animals, or of men and women, parts with its stronger qualities of body and mind when condemned to reproduce itself in this country.

Look at it, then, as we will, the business of manufacturing thrown silk in India does not seem to have very bright prospects before it. The Indian product will hardly retrieve its price in the European market, and the question of successful manufacture for export seems to depend on whether some cheaper way of working can be devised, since it is yearly becoming plainer that the old-fashioned style of filature, with costly buildings and European management, cannot be made to pay. But if the whole situation has thus to be reconsidered, it is worth while to go a step further, and ask whether the fault does not lie deeper than any mere change of system.

The grand secret of successful production is to have Nature as one's ally; but in seeking to produce thrown silk of European quality in India we seem to be constraining Nature against her will, or at any rate to be making the mistake of not setting her to work along the line of greatest efficiency. The special aptitude of the soil and climate of India is for the production of coarser kinds of silk; multivoltine varieties not adapted for reeling, but capable of a vast number of uses if properly spun. The demand for this waste silk, or wild silk as it is called, is rapidly growing in Europe, and at the present moment greatly exceeds the supply. A few years ago the product was valueless, but now we have improved machinery that can turn every particle of waste to account.

* * *

This sudden opening up of new prospects for waste or wild silk occurs most opportunely at a time when the cultivated silk industry, the manufacture of thrown silk, finds its outlook so miserably darkened. Silk firms might well consider whether they might not turn their capital to the development of this new trade, instead of sinking it in the attempt to rehabilitate a decaying business. India's place in the scale of production seems to be marked out by economic laws as that of a supplier of raw material. The tendency of modern improvements is to remove even the simple primary processes of manufacture from the first producer, and get them done by the same sort of agency as the secondary processes; indeed, the simpler the process the more ingenious and elaborate as a rule, is the machine. If this be true, the manufacture of silk in India is mere misdirection of energy; but in the growth and exportation of our waste and wild silks there lies an immense field all undeveloped. By wild silks we do not mean silk gathered from the jungle, but those species which, though cultivated, have never received any scientific attention: such, for instance, as the *eri* or castor-oil silkworm of Assam and North-Eastern Bengal, from whose cocoons the natives of these districts have for centuries spun thread which is wrought into fabrics of astonishing durability. Treated by the beautiful engines of the English spinner, these cocoons furnish the material for plushes with soft attractive handling, for rugs, and for other kinds of goods combining cheapness with beauty. The silkworm is an indigenous one; Nature co-operates with man in multiplying its production; and it seems reasonable to conclude that only capital and perseverance are wanted in order to lay the foundation of a new trade which may make the fortune of its discoverer and prove of immense benefit to the country.—*Tropical Agriculturist.*

METHODS OF POTTING.

Although the putting a plant in a pot appears at first sight a very simple process, and, indeed, is so with regard to plants of no very particular value, yet to many plants or families of plants it is doubtless of the first importance. Of what use would it be providing the best of garden structures, securing a sweet and wholesome atmosphere, &c., if our most delicate and choice plants were badly potted and their soils in consequence become sour and stagnant? And to ask further, what was it in former days that caused garden pots in greenhouses to be so liable to a coating of green scum, and the plants so particularly liable to the depredation of insects? Bad soils and bad pottings, doubtless, as predisposing causes.

One of the first improvements that took place in modern potting processes was the use of coarse and turfy materials instead of the finely riddled composts of former days. About the period of this advance people began to turn their attention to the make of garden pots also, and it was speedily discovered that the pots which had been so long in use were anything but faultless. Thorough drainage as a principle in potting was speedily a growing question, and received the utmost consideration from practical men in all quarters who were well up in their profession. These great improvements doubtless received an extra impetus through the introduction of so many choice plants, many of which, especially some of the finer-rooted, commonly called New Holland plants, showed evident signs that they would not thrive under the old system. The commencement of the exhibition era also much facilitated progress of the kind, and now it may be said that British gardeners can grow, in the very highest perfection of which it is capable, almost every plant placed in their hands, from whatever clime or under whatever conditions in its own locality.

The first thing I would direct attention to is two modes of potting quite distinct. I do not say that there are but two ways, but, for the sake of simplicity in the affair, we may at once reduce them to two modes: all others are in the main modifications of them. One may be characterised as loose potting, the other as firm or close potting. The loose mode is applicable in the main to annuals and soft-wooded plants, and, I may add, to most plants of what may be called ephemeral character. The latter class are required to make their growth as speedily as possible, in conformity with their habits and the services they are qualified to render; the former class requires durability in the texture of the soil rather than rapid excitement.

Now, plants of these two classes ought to be potted very differently; and, in order to illustrate the matter, let me take two plants, a Balsam and a Heath. These two every body is familiar with. In potting the former a compost is generally used, and this, in the ordinary language of gardeners, means a mixture. When such is used it becomes necessary that in order to have it uniformly mixed, the soil be passed through a riddle or sieve. This compost is filled in lightly round the Balsam plant, and a shake or two, with a very light pressure perhaps in filling, makes all right; but in shifting a Heath this process will not answer so well by any means. Here the skilful cultivator, after procuring his sandy and fibrous heath soil in a dryish condition, breaks it up into lumpy fragments, and these he places around the ball, packing them somewhat tightly, some even thrusting fragments of stones amongst the turfy material. As for the finer particles which fall out in the handling, he uses little of this but to coat the surface over.

As to watering newly potted or shifted plants, I may just show that this differs as much with these two classes as the potting or shifting process. The Balsam alluded to would in most cases benefit by a good watering with

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a fine-rosed-pot; but the Heath would require some extra caution. Most of our hard-wooded plants when repotted require that their ball of earth should be in a moist condition—not wet, but equally moist throughout. This secured, and the potting performed somewhat similarly to the Heath before alluded to, light watering, not over-frequent, with the spout of the pot will prove most suitable When I put Camellias I always make a point of so dressing up and pressing the surface of the new soil in the pot as to leave their stem in a small concavity. This induces the water when applied to penetrate the old ball, a thing I hold to be of much importance until the new soil is filled with roots, when the surface may be made perfectly level. Many a valuable hard-wooded plant is ruined by loose potting, the water in such cases rushing through the loose soil to the entire desertion of the old ball, the loose soil being speedily coverted into a kind of mud.

I have before alluded to the use of very fibrous soil as one of the chief improvements in modern potting; let me here caution the young beginner against potting with wet soil. If soil in a wet state must be used, then all my advice about firm potting falls to the ground. My practice is this:—Turfy or fibrous loam, having lain about six months in the compost yard, is chopped down when very dry with a sharp spade, leaving lumps the size of a large potato in it. This being well handled a considerable proportion of the more loose soil falls away, and this is put aside for ordinary purposes. The turfy material is now housed, no riddle being used; and this will lie for months in the potting-shed in a body, and prove always in excellent order for potting. Heath soil, peat, &c., are served in a similar way; and such materials in such a condition are qualified, either singly or in composts, to provide for every need in the plant way.

I must now recur to drainage matters. Here, again, practical men make a difference. Annuals, and many soft-wooded plants which soon come to perfection, require a very moderate amount of ceremony of this kind. A crock carefully placed over the hole, and over that a layer of the coarser materials of the compost will generally suffice, although I usually throw a little charred material over the crock, or a piece of moss. When, however, we take the more delicate of the hard-wooded class, specimens which have to remain a long time in their pots, and, indeed, plants of various kinds which are known to be somewhat shy rooters, the case is very different. Even in Camellia potting, for my part, I deem it expedient to be very particular; strange it is that some of our continental neighbours think and act so differently, for I have lately read that they are in the habit of simply thrusting a lump of turfy peat in the bottom of the pot, and also pot their Camellias almost entirely in peat. But it must be remembered that to grow young stock into a smart, saleable appearance, and to sustain large specimens in high blooming condition for many years, are two very different affairs. There can be little doubt that much of the failure so frequently complained of in Camellias, when in the hands of amateurs and small cultivators, arises in no small degree from the mode of potting them. Razors made to sell and razors made to cut are two very different things. I find also that where liquid manure is frequently used there is the greater need of sound drainage, as, under the best of circumstances, it has a tendency to close the interstices of the soil, especially if fine soil be used. I, however, bid utter defiance to this tendency by the use of very turfy and lumpy soil.

After all the care we can use in potting processes we may remember that it lies in the power of an ignorant and heedless waterer to nullify all our efforts in a very few weeks. This is a most serious consideration. The worst of it is that we scarcely know how to offer a rule to those who are careless or ignorant. A thoughtless person can never be relied on for watering; but the term "thoughtless" will scarcely express what I mean, for we have no cases of thorough mental inanition in those who labour with their hands. What I really mean is this—that no person can water plants well unless he actually cares for their welfare. Absence of mind is, therefore, here an unfortunate affair. One piece of advice may here be given to the uninformed. When plants are established in their pots, and require water, let them have a thorough watering, unless some special reason exists for dealing otherwise with them. Plants growing fast or blossoming heavily generally require more water than at other times; and plants sinking into a state of comparative rest, possibly shedding a portion of their foliage, bulbs, &c., require a very moderate amount of moisture; indeed, in many cases, none at all.

One other great feature in modern plant culture is the constant war that is sustained against the insect enemies of plants. On this, however, it is no part of my present purpose to dwell; I merely point to it as dividing the honours attached to the high success of these times with good potting and watering. But I would observe that there is such a thing as predisposition in plants or families of plants to insects, and that one of the most fertile causes of this predisposition may be found in abuse of the root-action through bad soils, bad potting, and bad watering.

I would here beg the earnest attention of all inexperienced plant cultivators to a close consideration of the before-named principles, and suggest to them that the general health of plants is more dependent on the soil, and, in consequence, the root-action, than upon any precise amount of heat, or, indeed, any of those little collateral matters which are, as it were, subsidiary to high culture, and recommend that a due attention be paid to the potting-shed and the conservation of soils.—R. E.—*Journal of Horticulture.*

METHODS OF MEASURING THE HEIGHTS OF TREES.

First. To measure the height of an object by means of two poles: The one pole should be at least double the length of the other. Fix the long pole perpendicularly at any convenient distance from the tree or object; then, taking the short pole, move backwards till the top of the two poles and the top of the tree coincide. Then as the difference in height of the two poles is to the distance between them, so is the height of the object to the distance from the object to the pole at the level of the observer. Second. To measure the height of an object by means of its shadow: Fix a pole in the ground in a vertical position, and in as level a situation as possible. Measure the length of the shadow of the pole, likewise the shadow of the object; then, as the height of the pole is to its shadow, so is the height of the object to its shadow. Third. To measure height by means of a triangle. Dress a piece of board exactly square, and not less than 6 in. on the side; divide the square with the saw diagonally, from corner to corner. This transforms the square into two right-angled triangles either of which may be used for ascertaining the height of any object. For convenience the triangle may be fixed to a staff or stake. One side of the triangle should be kept perpendicular, the other horizontal, which is easily done by means of a small plummet. In making an observation with the instruments look along the sloping side and move backwards or forwards till the sloping side coincides with the top of the object, the distance from the observer to the object being equal to its height. The part of the tree or object below the level of the observer's eye must be added to the observed height of the object. Fourth. A 2-ft. rule, with a small level fixed in one of the limbs, and the circumference of the joint divided into degrees, is a convenient instrument for measuring the angle or dip of rock formations, height of trees, and various other purposes. To measure the height of a tree, the rule is opened till the limbs stand at an angle of 45°. The limb with a fixed level is held horizontally. Then move backwards or forwards till the sloping side of the rule coincides with the top of the object, the height of which is equal to the distance of the object from the observer, as in the last method. Fifth. An optical instrument, termed "the Apomecometer," was produced in 1869 by the well-known instrument maker, Mr. W. F. Stanley, the invention of Mr. R. Millar. The instrument is founded on the same principles as those which govern the sextant. It is 1½ in. long, and 1 in. wide at the broadest part, and ½ in. thick, and weighs little more than 1 oz. Mr. Millar says, "It never went astray with me during six months' travel on the Continent, though I invariably kept it in my pocket, where it received no small amount of knocking about." I may here remark that in measuring the height of an object by means of the "apomecometer," or by means of any fixed angle, the observer requires to be at a distance equal to the height of the object to be measured. For isolated objects this is an inconvenience, but in the case of measuring the height of a tree in a forest or plantation it becomes a very different thing. In nine cases out of ten the observer would find that at a distance equal to the height of a tree to be measured some intervening tree or object would be in the way of his vision. Therefore, in order to obviate the difficulties referred to, I may here state that I have constructed a simple instrument for measuring the height of

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trees or any object at any convenient distance, no calculation being required. Paradoxical as it may appear, the height of the object is measured before the observation is taken.—J. KAY, Forester, *Bute Estate, Rothesay*, in "Gardeners' Record."

SOAP AS AN INSECTICIDE

Professor Riley, the State Entomologist of the Washington Department of Agriculture, has found, after a long series of experiments, that common soap is about the best and cheapest insecticide that can safely be used in gardens. Alcohol is too expensive, and volatile oils more or less injurious to plants; experiments with some of the latter, such as naphtha, turpentine, &c., having resulted in the total destruction of some orange-trees on which they were tried. Crude petroleum, he says, destroys the bark; and even the refined oil in hot sunshine completely strips the tree of leaves. A mixture of kerosine with milk, which is subsequently diluted with water, was found to be apparently innocuous; but it requires trouble in the mixing, and care in using. The Professor makes the following remarks with regard to soap:—The value of soap as an insecticide has long been known; and the experiments which I tried with it were made chiefly for the sake of comparison with those made with other substances. The results, however, were so remarkable, that I feel warranted in saying that taking into consideration its efficiency as a means of destroying scale insects, its effect upon plants, and its cost, there is at this time no better remedy known than a strong solution of soap. In my experiments whale-oil soap was used, and the solution was applied by means of a fountain pump to orange trees infested with the red scale of California. In the strongest solution used the proportions were three-fourths of a pound of soap to one gallon of water. The mixture, was heated in order to dissolve the soap thoroughly; and the solution was applied while yet heated to about 100o F. The tree upon which the experiment was made was very badly infested, the bark of the trunk being literally covered with scales. Four days after the application of the solution, I examined the tree very carefully, and could find no living insect on the trunk of the tree, and only a small proportion of the coccids on the leaves appeared to be still live. I was unable to examine the tree again personally, but three months later Mr. Alexander Craw, of Los Angeles, made a careful examination of this and some other trees upon which we had experimented, and on this one he was unable to find any living scale insects. Taking into consideration the extent to which this tree was infested, and the fact that but a single application of the solution was made, the result is remarkable. In another experiment the solution was made as in the above, and then an equal amount of cold water added. The tree experimented upon was similar to the one used for the former experiment. Four days after the application no living insects could be found on the trunk of the tree and only a very few upon the leaves. In fact, the experiment was as successful as could be expected, it being very difficult to reach every insect on the leaves by a single application. When Mr. Craw examined this tree three months later he found but few living insects on it. As a result of all of my experiments with soap, I recommended the use of it in the proportion of one-fourth pound of soap to one gallon of water, repeating the application after an interval of a few days. If a cheap soap be used which can be obtained for from four to six cents per pound, the cost of the remedy will not be great compared with what is to be gained.—*Indian Agriculturist*.

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Editorial Article.

COMPOSTS FOR POT PLANTS.

One of the most important matters connected with the cultivation of imported or acclimatised plants,—which have in this country to be cultivated mainly in pots or restricted borders, frequently under glass or carefully shaded houses, and have, as a consequence, to be constantly supplied with water by artificial means—must always be the constituents of the soil in which they are potted or planted. Although certain plants—the Croton for instance—appear to be not over particular as to what description of soil is used as a basis for a compost, yet even such plants attain to different degrees of health and vigour when the soil most suited to their nature preponderates. Good culture in all other respects lessens the evils arising from a misapplication of soils; but when a plant finds its element in this respect, and is otherwise properly cared for, its character is developed with more freshness and vigour.

We believe it is correct to say that the chief features of the horticulture of the present, as compared with that of the past, is, that complicated mixtures of soils and manures are less used and believed in as "the secret" of successful culture, and that the tendency is still in the direction of simplicity in this respect. Mixtures when compounded from fancy, and with little knowledge of the elements of chemistry, may or may not be compounds of evil. After many years of extensive practice we are thoroughly convinced that the mixing of different sorts of soils and manures for potting plants in general is an evil to be avoided, and feel certain that a plant that thrives in loam will thrive better in it ultimately—make a more healthy and robust plant—if there are no animal or organic manures mixed with the turfy loam. We of course mean all organic manures of a rapidly changing character which putrifies, even though in that process the substances formed are highly important to plant life. All such, and humus of every description, are best left out of the soil in which all the slower growing and more hard wooded plants are potted, if they are to be healthy, floriferous and long lived. By so doing the soil runs far less risk of becoming what is well understood by the term soured, and, of course, unhealthy. It may be asked, are the excrements of animals and decaying vegetation not beneficial to such plants? Undoubtedly they are; but not mixed in with the soil in a narrow, deep vessel like a flower-pot. Such highly stimulating, and more or less fermenting, substances are best applied as a top dressing when the plants require it. The turfy loam generally used for potting possesses, at first, much organic matter, of a less rapidly changing (because to some extent differently incorporated with the soil) as well as of a more natural character; and as a rule no other manure need be mixed with the ball of earth in the pots, unless it be of a less rapidly changing character,

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such as ground bones. Take for instance a Croton and a Dracæna—plants of very diverse characters. They thrive splendidly in light turfy loam, and require nothing else till their pots get pretty well filled with roots. Then a top dressing of rich manure is of immense benefit to them, which if mixed with the soil at the time of potting, is not only unnecessary but positively injurious. The roots which these two plants make in the loam pure and simple, with perhaps the addition of some charcoal and bones, are far more numerous, and of a different character to those produced in soil made rich and soft with rapidly decaying manure, in which the roots are long and less twiggy, escaping more rapidly down among the drainage into simpler and sweeter fare.

As a rule we neglect far too much of nature's rule of potting and nourishing her children. We put manure of a too gross nature *into* the soil; Nature lays it on the surface. We give a narrow, deep body of soil, with comparatively little surface exposed to the air, and that little is far too often a mass of gangrene and slime; on the other hand nature, as a rule, gives a shallow body of earth with a great wealth of surface clothed with living verdure of some sort. In all these respects we cannot in small gardens or houses follow the lead of nature in the culture of plants in pots. But the further the departure from her ways, the more likely we are to be in error. We can however top dress more and mix less humus *in* our soils. Who will say that flower-pots would not be better if made a little shallower and a little wider? With regard to the mixing of stones or charcoal, or clean broken potsherd, this can be followed without any offence to the eye, or any extra space. This we have come to regard as a cardinal point in the pot culture of nearly all plants that are not of the grossest and most ephemeral kind. Who that has had much to do with plant growing and potting has not noticed that a plant that has clean crocks, or, best of all, charcoal mixed to a liberal extent, with the soil in which it has been potted, has always been in a more satisfactory condition the next time it required a shift, than when these substances find no place in the soil? Take any hard-wooded flowering or ornamental foliage plant, and in potting it fill one side of the pot with soil in which charcoal is liberally mixed, and the other with soil devoid of that substance, and in twelve months, when the plant needs another shift, it will be found that there are double the number of rootlets on the side of the charcoal to what there is on the other. Wherever a few pieces of broken pot or charcoal are found in the ball of a plant, there the roots are found to muster in greatest numbers and health.

The mixing of these substances, in imitation of nature's prodigality, is not practised to the hundredth part in plant culture that its good effects demand. Charcoal has a wondrous charm for roots, and is of the very foremost importance in the soil of nearly all pot-grown plants. It has a beneficial mechanical effect; has a sweetening tendency; is highly useful, absorbing ammonia and other plant food from air and water and from all decaying substances in its vicinity; while its own character is most unchangeable. It prevents stagnant water; and being such a store-house, is a safeguard against extreme drought. In the case of nine plants out of every ten, it would be well if charcoal formed a fifth part of the whole compost in which they are potted.

Editorial Notes.

STRAWBERRIES.—It is estimated, says the *New York Tribune*, that during the "Strawberry month" Chicago receives 10,000 bushels of this fruit per day.

FRAGRANT FLOWERS.—The perfume manufacturers of Nice and Cannes crush 154,000 lb. of Orange blossoms, 13,200 lb. of Acacia flowers, 154,000 lb. of Rose petals, 35,200 lb. of Jasmine blossoms, 22,000 of Violets, 8,800 lb. of Tuberoses, and a relatively large amount of Spanish Lilacs, Rosemary, Mint, Lime and Lemon blossoms every year.—*Journal of Horticulture.*

THERE are no less than forty thousand square miles of almost unbroken forests in North Carolina—pine, chestnut, oak, maple, beech, and hickory timber in their finest growth. Within the next ten years it is estimated that the timber alone in North Carolina will exceed in value the present total valuation of all the property in the State, including land. The State grows as many as nineteen varieties of oak, and its pine forests are of the heaviest.

BRAZILIAN FLOWERS.—Travellers in Brazil speak of Fuchsias 50 ft. and 60 ft. in height, blooming from top to bottom; of large bushes of Abutilon venosum, bearing a profusion of orange bells streaked with crimson; of huge Daturas, with hundreds of white trumpet-shaped and sweet-scented blossoms, some 16 in. in length; of Orchids and Ferns; huge Arums with shield-like leaves, large enough to cover a man; brilliant red and yellow Bromelias and Tillandsias; epiphytes and parasites of all descriptions; Camellias large enough to climb into to pluck the topmost blossoms.

A VETERAN PEACH TREE.—P. M. Augur reports, in the Middletown (Connecticut) *Constitution*, that he examined a Peach tree at the residence of Henry Hart, in Saybrook, Connecticut, which at 2 feet 10 inches above the ground measured 4 feet around. It had four principal branches having the circumferences respectively of 2¼ feet, 2.15 feet, 2 feet, and 1.14 feet—a total of 8½ feet, or twice that of the main trunk. The tree has been a constant and abundant bearer. This indicates that the Peach tree is not necessarily a short-lived one, as is generally supposed.—*American Agriculturist.*

VITALITY OF EUCALYPTUS SEEDS.—Baron von Mueller writes: "It may interest your readers that Eucalyptus seeds show an unexpected tenacity of life. I took from my dried plants of Eucalyptus miniata seeds, which were for experiment gathered in 1867. They were committed to the care of Mr. Will. Elliott, one of our best horticulturists, and he had the satisfaction to see nearly every grain germinate. It is possible that the seeds of E. miniata may retain their vitality longer than those of the species with smaller seed grain; still, this unexpected fact is interesting. My former experience led me to think that Eucalyptus seeds germinate better when stored for a short time than when quite fresh, the embryo undergoing probably at last still some final maturation. E. miniata is as gorgeous a species as E. phœnicia, both having the fiery blossoms of a Callistemon, and produce for a much longer succession of weeks their flowers than the splendid E. ficifolia."

PHYLLOXERA LAWS.—The kingdom of Greece is the last that has found it imperative in the interest of the vineyard culture,—an important one indeed for the miniature monarchy—to forbid all trade with North and South America, Australia, Africa, the coast of Asia Minor, and the whole of Europe with the exception of Holland, Belgium, Denmark and the Scandinavian Kingdom, in trees and plants of every kind, fresh fruits and their foliage,

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fruit juice in natural or mixed state; flowering bulbs, and fresh fleshy roots of every description; Vine stakes which have been used in vineyards; and lastly, hay in bundles. The regulation dates from July 5, 1885. As usual the restrictions are for the most part absurd and unnecessary.

ANTIQUITY OF THE TOMATO.—Several interesting statements are made by "Science Gossip," showing the length of time the Tomato has been known in gardens. Galen, who lived in the second century, uses the name Lycopersicum, but it is not known to what plant he alludes; an Italian writer, in 1561, however, thinks Galen meant the Tomato. Dodoens, a Dutch botanist, describes it as grown in his time (1583), and as eaten dressed with pepper, vinegar, and oil. Gerard mentions it in his "Herbal" in 1597, and calls it Pomum amoris or Love Apple, and describes red and yellow-fruited sorts. Parkinson, in 1656, says it is cultivated only for curiosity, and for the "amorous aspect or beauty of the fruit." A century afterwards Miller states it was used in soups. About the year 1825 we remember its extensive use on the table, cooked and uncooked. In France and Italy there are whole fields devoted to the cultivation of the Tomato; and so great is the demand for it in some parts of the latter country, that there is scarcely a dinner served up in which it does not in some way or other form a part.

A NEW METHOD OF VINE CULTURE.—We take the following from an Anglo-Italian journal, which evidently accepts the statement in full confidence. What a pity editors of public journals do not take the advice of their *confrères* of the horticultural Press before printing such rubbish. We have seen cuttings thrust into Potatos to keep them fresh: has some hoaxing "Yank" seen something of this kind and invented the rest?—

"A great discovery has been made on the Mojave desert, which seems destined to revolutionise viticulture in Southern California. It has been found that Grape cuttings inserted in the trunks of the Cacti on the desert grow and thrive as vigorously as in cultivated land. This fact is of great importance to the people. By the use of a chisel a man can plant a large vineyard in a day, and the Vine so planted will climb the Cactus and grow luxuriously without cultivation or irrigation. The dry, hot sands of the desert will afford a fine place for drying raisins. In addition to Grapes it has been proved that Melons, Cucumbers, and Tomatos will grow from the Cactus stock, so that the desert may soon blossom as the Rose."

PLANTS IN LIVING ROOMS.—There was once, still is, perhaps, a superstition that plants in rooms are unwholesome. Setting aside special cases it may be said that, as a general rule, plants in a living room, if they have any perceptible effect at all, are beneficial rather than otherwise. We are glad to see the Faculty taking this view of the subject. An American physician has, it seems, pointed out that by their powers of transpiring moist vapour plants render great service in rooms warmed by dry air. The value of plants and flowers as *délassement* for the weak and weary is acknowledged on all hands. Dr. Anders, according to the *British Medical Journal*, goes further, and states that the pursuit of gardening, though naturally it favours rheumatism, appears to arrest consumption in persons of phthisical tendency, while the abandonment of the pursuit in other cases led to the development of the disease. Dr. Anders recommends a room well stocked with plants as a complete and agreeable health-resort free from the inconveniences of travelling and the anxiety of separation from home. We concur with our contemporary in the opinion that the Doctor has opened up a most interesting subject for investigation.—*Gardeners' Chronicle.*

THE CREOSOTE PLANT.—According to a note in a recent number of *Land and Water*, the resinous substance found on the branches of Larrea mexicana has been proposed as a substitute for lac in the preparation of lac-dye. The plant, which belongs to the natural order Zygophylleæ, is a shrub from 4 to 6 feet high, growing in dense scrub-like masses in Mexico, especially on the borders of the Colorado desert, where its luxuriant growth forms an impenetrable mass of vegetation, effectually preventing the inroads of the drifting sand. The presence of this plant is said to be a sure indication of a sterile soil, little else being found where it flourishes, though the bright green of the foliage imparts a freshness to the surrounding scenery. The common name is derived from the fact that the plant has a strong creosote-like smell, which is so powerful that no animal will touch it. The resinous matter to which the odour is due is abundant in all parts of the plant, the branches being frequently covered with it, in the same manner as true lac. The resin itself is of a light ruby colour. It is used by the natives in the treatment of rheumatism; it is also used by the Indians for fixing their arrowheads to the shafts, and for forming into balls, which they kick before them as they journey from point to point of their trail.

WATERING.—By those who have only an imperfect knowledge of the cultivation of plants it is often supposed that any one is capable of giving them water, or in other words, of knowing when they require it, the too general impression with the uninitiated being that if a sufficient supply be given all must be right, and that the plants will go on and flourish. Yet it is a question if amateurs in their first attempts at plant-growing do not kill greater numbers by the too free use of the watering pot than those who are neglectful on that point. When a plant is placed with its roots in the open soil, or even when it is similarly situated in the bed of a conservatory, it is much less likely to suffer from either extreme of too much or too little water than when confined in a pot; for if the soil at any time have too much water applied it will more quickly drain off than it will from a pot, and the roots naturally keep more to the surface when they have room to spread out in a horizontal position, which renders them less likely to suffer if the soil happen to get too wet; on the other hand, if the soil become too dry, the roots, from the increased space allotted to them, have a better chance of extracting the moisture they require from the greater body of earth available; and lastly, the roots and the whole plant collectively are usually in a more robust, vigorous condition, and less likely to succumb from any extreme of treatment to which they may be subjected; hence, the necessity of a closer attention to the watering of plants grown in pots.

HOW DOCTORS DIFFER.—In the vegetable kingdom there are several substances that possess the double quality of food and medicine, and as such might be usefully employed in therapeutics. Among the vegetables that possess the valuable property referred to Water Cress may be mentioned. According to an analysis by M. Chatin, Director of the School of Pharmacy of Paris, and present President of the Academy of Medicine, Water Cress contains:—1, a sulpho-nitrogenous essential oil; 2, a bitter extract; 3, iodine; 4, iron; 5, phosphates, water, and some other salts. As medicine the Water Cress has been vaunted for its efficacy in all cases in which the digestive organs are weak, in cachexia, in scurvy, in scrofula and lymphatism; it has even been prescribed as a cure for phthisis. The medicinal principles which it contains are more or less abundant according to the culture or maturity of the plant. Thus when the plant is in flower they are in greater quantity than before that condition; the essential oil increases according to the quantity of the sun's rays to which the plant is subjected. The proper culture of Water Cress develops in it the bitter and tonic principles, and the phosphates will be found in proportion to the manure employed. Finally the quantity of iron will depend upon the richness of the water in which the cress is planted. As food Water Cress ought to be used in its green or uncooked state, in the form of salad or without any seasoning. Water Cress enters largely into the composition of the "sirop antiscorbutique" of the French Pharmacopœia.—*British Medical Journal.*

OVERCROWDING.—There is a great inducement held out to amateurs to attend plant sales, and occasionally purchase ten times the quantity they require; the consequence is they are planted in various parts of the ground to the great detriment of those plants

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which before were thickly enough crowded together, and after being eyesores during a few months a considerable portion has to be thrown away, being nearly dead when they were obtained. Some persons suppose that, if they can buy large quantities of any article at a reduced price, it must of necessity be cheap, whether they require it or not; but such purchases are often but little better than waste in the end. It is much better to buy what is really wanted than to buy what is not required. Take, for instance, a simple matter like the sowing of annuals. Generally the seeds are small, and it is difficult to avoid sowing somewhat thickly—always too thickly. Now, instead of leaving to grow the entire number of plants that come up, it is far better to thin them out to 1 in. or so apart, and by so doing the individual plants will make a better growth, and the flowers would be much finer, and there will be a longer succession of bloom. Many good and useful annuals are brought into disrepute in the garden because they are not well treated in the matter of culture, and a good hint in regard to quick growing and blooming annuals is to make a fresh sowing just as the first crop is coming into bloom, so as to ensure a supply in the autumn. How can it be supposed that plants growing close together should look well, or produce flowers and fruit to the satisfaction of anyone? There is no room for development, for the ripening of the wood, or the perfect maturation of the bloom buds. How can the roots receive the warmth of the sun, or the benefit of refreshing showers?

Original Artitles.

THE ROSE.

Selection of Varieties.

Although in the long list of varieties described in previous chapters, we have been careful to include only such as can be confidently recommended, still amongst such a host the inexperienced amateur may find a difficulty in choosing the kinds best suited to his requirements. We will therefore now endeavour to assist him, as far as possible, by giving selections of varieties adapted to the various purposes for which Roses are generally required. Some of our readers may exclaim, Why! a good Rose must be good no matter for what purpose it may be required! But such is far from being the case. A variety that would be considered a first class Exhibition Rose is rarely a good garden Rose, and a good garden Rose would certainly be out of place among Exhibition varieties, and mainly for this reason that in the one we need quality and in the other quantity of bloom. It may be well to state a few of the leading characteristics of what most of us consider a fine Rose, whether species or variety. All varieties (excepting the Moss Rose) should possess foliage of a deep shining green, which colour to be perfect needs to be permanent, although not likely to be found in many varieties, our preference being for a sort of evergreen foliage. However size, form, &c., may vary in different varieties, uniformity in the same variety is desirable. A fine Rose is one which is beautiful in all its stages of bud and blossom, up to and previous to wide and full expansion. Single and double flowers while enclosed within their calyxes, are alike beautiful up to a point where they expand to hide the calyx; but the double possess that characteristic which make them magnificent when full blown, while the singles are best shown previous to full expansion. Whatever difference there may be otherwise, the petals of all Roses should be thick, broad and smooth at the edges. The flower should be double to the centre, high on the crown, round in outline, with regularly disposed petals. The peculiar characteristics of any and all varieties should be strongly and fully developed in each flower. The bud and blossom should possess fragrance, and the higher that fragrance the more beautiful the variety. On this point a well known writer says:—"To all who grow Roses for the beautifying of the garden and the adornment of the house, it is pleasant to hear from various sources that a growing feeling of protest is aroused against the many scentless varieties so constantly appearing at exhibitions generally. As in the tournaments of old knights contended for the sake of a smile from their chosen dame, so should we also in these modern days imitate their example, nay more, raise a crusade against those who dishonour the queen of flowers by raising and showing scentless Roses that do but mock our senses by an outward show of all that is beautiful; and thus begin a war of Roses, no longer of York and Lancaster, or of red and white, but of the sweet-scented *versus* the scentless, in which all should enlist to oppose resolutely the taste that condones any defect that is not apparent at the exhibition table—a taste that values size more than scent, indeed usually ignores the latter altogether; uniformity of shape more than that variety which we are elsewhere told is so pleasing, and even encourages rankness of growth rather than freedom of flowering, and has, to make a long story as short as may be, loaded our gardens and the lists of nurserymen with many varieties that are grown merely to be discarded. It would hardly be just to accuse exhibitors as the source of all these evils, but rather confess that the love of novelty, to which all must plead guilty, has also largely contributed, and as all true lovers of the Rose must always desire to see something more beautiful than they yet possess, the most obvious way of effecting a change so desirable, is to establish prizes for Roses in which scent shall rank as an equal qualification to those already demanded, and, in the case of new Roses, excluding them from the highest honours at shows if they lack the crowning grace of sweetness. It cannot be urged that exquisite perfume and freedom of habit are incompatible with size and shape, when such a Rose as La France has been for years before our eyes and noses, and those who raise new Roses should be invited by special prizes to leave no stone unturned to bring us still nearer to perfection, and, by demanding a guarantee that their beautiful novelties are sweet-scented, throw back on their hands all that are faulty in this particular. If this were done how often should we be spared the annoyance of finding that a Rose we had admired at a show was, when grown at home, devoid of scent and scanty in blossom.

Herbaceous borders, Alpine rockeries, and wild gardens are just now the ruling taste of the day, and in the latter place we can all find beauty in the Pæony when its brilliant petals are bathed in June sunshine there, then, let us place those beautiful impostors that will, in the end, bring discredit on the Rose, and reserve for our Rosery and loving care only those that really are of highest excellence; and, if we cannot refrain from showing scentless Roses, let them have a class to themselves, and then no one can complain. A list of all the scentless Roses would be instructive, in the sense of how to avoid if some great authority would compile such an "Index expurgatorius" (for who would buy a scentless Rose?); but, in the meanwhile, a few of the head offenders may be mentioned as a guide to the unwary. Perhaps there is no greater offender than the familiar Victor Verdier, scentless itself, and the parent of so many scentless offspring, among which are Comtesse d'Oxford, Mdlle. Eugénie Verdier, Hippolyte Jamain, and many others. Baroness Rothschild, Paul Néron, Duke of Edinburgh and his descendants, are also in the same list, and Etienne Levet and Marquise de Castellane, Mons. Noman and Anna Alexieff must be added to it.

It is curious to remark that, while Tea Roses are generally considered the most powerfully scented, the new Tea Hybrids hitherto are lacking in this quality, though they may just escape the imputation of utter scentlessness; and, still more remarkable, that Gloire de Dijon, one of the sweetest of Roses, has not transmitted that quality to its descendents. For instance, Madame Trifle, Madame Levet, and Tour Bertrand are without scent, and Belle Lyonnaise and Madame Bérard are nearly so, and as an instance to the contrary, Maréchal Niel itself, one of the most remarkably powerful-scented Roses, is said to have Isabella Gray for its parent, a Rose that is devoid of all smell. While urging the necessity of scent to the Rose, if it is to keep its place as first and foremost among flowers, the desirability of free blooming must not be overlooked; but this is just now not likely to be forgotten when the tide is setting in favour of these Tea Hybrids, which promise so much; and, until such a combination has been achieved, till our gardens are full of new varieties surpassing all we now possess in sweetness, size, shape, colour, and freedom of bloom, let us not rest content or turn our attention to other qualifications.

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Among old Roses none is more resplendent in a garden than Eugene Appert ; its glowing colour, endurance, beautiful foliage, and freedom of flower still place it in the front rank. Sénateur Vaisse is too well known to need further notice. Dr. Andry is a Rose that no garden should be without, a sure physician to heal all disappointment; his complexion is an index of his vigour, which defies all ordinary trials. Madame Victor Verdier is also a model Rose in every respect, brilliant in colour, deliciously sweet and free-flowering, handsome in growth and leaf. This Rose, I fancy, is not yet appreciated fully ; perhaps from its resemblance to Sénateur Vaisse, which, to my thinking, it surpasses. Duke of Edinburgh would be second to none if it were not scentless; and Paul Néron, were it not for the same grave defect, would be as necessary to a garden as La France is, for its huge size and coarse appearance vanish when treated with judicious neglect, and its flowering powers are indeed great when fully established and clothing some pillar. Baroness Rothschild and Countess of Oxford are, alas ! also scentless, but who could leave such beauty in the lurch ? Of less strongly growing Roses, Maurice Bernardin, Louis Van Houtte, and Xavier Olibo are remarkable for their excellence in every way, and the twin Roses Alfred Colomb and Marie Baumann make it an impossibility for anyone to choose between them. Charles Lefebvre and Jules Margottin must not be left out of our "garden party," though it is hardly necessary to mention them and other favourites whose fame is as great as their deserts."

As a full description of all the varieties mentioned in the following groups has already been given in previous chapters, it is unnecessary for us to give anything more than their names.

The best One Hundred Hybrid Perpetuals,

for general culture.

Abel Carriere
Abel Grand
Alfred Colomb
Alfred K. Williams
Annie Laxton
Annie Wood
Antoine Ducher
Auguste Neumann
Auguste Rigotard
Beauty of Waltham
Camille Bernardin
Captain Christy
Centifolia rosea
Charles Lefebvre
Charles Rouillard
Comtesse de Chabrillant
Comtesse de Serenyi
Countess of Oxford
Countess of Roseberry
Crimson Bedder
Devienne Lamy
Dingee Conard
Docteur Andry
Duc de Rohan
Duc de Wellington
Duchess of Bedford
Duke of Albany
Duke of Connaught
Duke of Edinburgh
Dupuy Jamain
Earl of Pembroke
Edward Morren
Elie Morel
Emilie Hausberg
Emily Laxton
Eugene Appert
Exposition de Brie
Fisher Holmes
François Louvat
Geant des Batelles
General Jacqueminot
Harrison Weir
Hippolyte Jamain
Horace Vernet
John Hopper
Jules Margottin
La France
La Rosiere
Le Havre
Lord Bacon
Lord Beaconsfield
Lord Macaulay
Louis Van Houtte
Madame Charles Wood
Madame Clemence Joigneaux
„ Gabriel Luizet
„ Hippolyte Jamain
„ *la Barrone de Rothschild*
„ *Lacharme*
„ *Noman*
„ Victor Verdier
„ Vidot
Mdlle. Julia Dymonier
„ *Marie Cointet*
„ *Marie Rady*
Magna Charta
Marechal Vaillant
Marguerite de St. Amand
Marie Baumann
Marquis de Castellane
Masterpiece
Maurice Bernardin
Mervielle de Lyon
Miss Hassard
Monsieur Boncenne
„ *Etienne Levet*
„ *E. Y. Teas*
„ *Noman*
„ *Paul Neron*
Mrs. Baker
„ *Laxton*
Nardy Freres
Peach Blossom
Pierce Notting
Pride of Waltham
Prince Arthur
Prince Camille de Rohan
Princess Beatrice
„ *Louise Victoria*
Reynolds Hole
Senateur Vaisse
Sir Garnet Wolseley
Star of Waltham
Sultan of Zanzibar
Thomas Mills
Ulrich Brunner Fils
Vicomte de Vigier
Victor Verdier.
White Baroness.
Xavier Olibo.

The best Fifty varieties are printed in italics.

A Selection of the best 60 Varieties for Exhibition.

Alfred Colomb
Alfred K. Williams
Annie Wood
Baroness Rothschild
Beauty of Waltham
Camille Bernardin
Captain Christy
Catherine Mermet, T.
Charles Lefebvre
Comtesse de Nadaillac, T.
Countess of Oxford
Devienne Lamy
Devoniensis, T.
Dr. Andry
Duc de Rohan
Duchess de Caylus
Duchess of Bedford
Duke of Edinburgh
Duke of Wellington
Dupuy Jamain
Elie Morel
Emilie Hausberg
Etienne Levet
François Michelon
Harrison Weir
Horace Vernet
John Hopper
La Boule d'Or, T.
Lady Mary FitzWilliam, H. T.
La France
Le Havre
Louise Van Houtte
Madame Bravy, T.
„ Clemence Joigneaux
„ Gabriel Luizet
„ Lambard, T.
„ Margottin, T.
„ Victor Verdier
Mdlle. Marie Rady
Marechal Niel, N.
Marechal Vaillant
Marguerite de St. Amand
Marie Baumann
Marie Van Houtte, T.
Marquis de Castellane
Mervielle de Lyon
Mrs. Baker
Monsieur E. Y. Teas
„ Noman
Niphetos, T.
Perle des Jardins, T.
Pierre Notting
Reynolds Hole
Rubens, T.
Senateur Vaisse
Souvenir d'Elise, T.
Souvenir d'un Ami
Sultan of Zanzibar
Victor Verdier
Xavier Olibo

The names with no letter attached are Hybrid Perpetuals.

T. signifies Tea scented H. T. Hybrid Teas, N. Noisettes

The best Forty Varieties of Tea-scented Roses.

Adam
Adrienne Christophle
Alba rosea
Aline Sisley
Beauty of Stapleford, H. T
Catherine Mermet
Cheshunt Hybrid, H T
Climbing Devoniensis
Comte de Paris
Comtesse de Nadaillac
Countess of Pembroke, H T
Devoniensis
Duchess of Connaught
Duchess of Westminster
Etoile de Lyon
Gloire de Dijon
Jean Sisley, H T
La Boule d'Or
Lady Mary FitzWilliam, H T
Madame Angele Jacquier
Madame Berard
„ Lambard
„ Levet
„ Trifle
„ Welche
Marcelin Roda
Marie Ducher
Marie Van Houtte
Niphetos
Pearl, H T
Perfection de Montplaiser
Perle de Lyon
Perle des Jardins
Pierre Guillot, H T
Reine Marie Henriette, H T
Safrano
Souvenir d'Elise
Souvenir d'un Ami
Vicomtesse de Cazes
Viscountess Falmouth

The varieties to which the letters H. T. are attached belong to the Hybrid Tea class.

The best Varieties of Climbing Roses.

Cheshunt Hybrid, H. T.
Climbing Captain Christy, H. P.
„ Charles Lefebvre, H. P.
„ Countess of Oxford, H.P.
„ Victor Verdier, H. P.
„ Devoniensis, T
Celine Forestier, N
Cloth of Gold, N
Gloire de Dijon, T
Lamarque, N
Marechal Niel, T.
Reine Marie Henriette, H. T.

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Solfaterre, N. W. A. Richardson, N.
Triomphe de Rennes, N.

H. P. Hybrid Perpetual, T. Tea-scented, H. T. Hybrid Tea, N. Noisette.

New Roses.

As mentioned in a previous chapter, we cannot too strongly advise amateurs to approach these with extreme caution. It is yet too early to give a decided opinion as to the merits of varieties introduced in 1884 and 1885, for although many of the former have flowered with us this season, the plants are not yet sufficiently acclimatised to produce first class blooms. As far, however, as we are able to judge, there are but very few amongst them that will take a position in the front rank of Rose society. The following we consider the most promising :—

Hybrid Perpetuals.

Name.	Description.	Habit of Growth.
Baronne N. De Rothschild	Silvery rose, large and double	
Belsunce	Vermilion, shaded carmine ; large and full.	
Climbing Pride of Waltham	Light salmon-pink, same flowers as the type, but the plant has a vigorous habit...	
Climbing Hippolyte Jamain	Bright rosy carmine, good glossy foliage, rendering it very desirable as a climbing or pole Rose	
Docteur D'Gr.	Shaded red ; large and full, shaped like a tea-scented variety ; very free	
Duke of Marlborough	Bright red, faint tinge of crimson ; large and well formed ; vigorous	
Etta Gordon	Bright cherry colour ; large and full	
Etandard De Lyon	Bright red ; large and well-formed	
Gloire Lyonnaise	Flowers large, well-formed and full, colour of a beautiful shade of chrome-yellow, a cross between *Baronne Ad de Rothschild* and *Madame Falcot* ; a grand addition	
Gipsy	Red, shaded deeper ; medium size	
Lady of the Lake	Peach colour	
Laurent De Rille	Light cherry-red ; imbricated ; full, free	
Madame Pituval	Bright clear red ; large and full	
Madame Therese Delacour	Bright carmine-pink ; moderate size ; full	
Mrs. C. Swailes	Beautiful flesh colour, bright and clear ; petals broad ; free	
Mrs. G. Dickson	New shade of satiny pink ; large ; vigorous	
Mary Bennett	Brilliant rosy cerise ; fine for forcing	
Marshall P. Wilder	Cherry carmine, large, semi-globular, full, and well formed. An American variety, recommended for its vigour, hardness, and freedom in blooming	
Mary Bennett	Brilliant rosy cerise, large, and of beautiful form opening well, thoroughly perpetual ; a fine exhibition Rose, and excellent for forcing.	
Pride of Reigate	The first striped Hybrid Perpetual Rose; it is the light crimson of *Comtesse d'Oxford* from which it sported, charmingly striped with white	
President F Crespo	Bright pink or light red; large and full	
Professor Edward Regel	Cerise-red large, full, and of perfect form ; in the way of *Mdlle Annie Wood*	
Prosper Laugier	Scarlet-red, shaded with brilliant carmine, large and full	
Princesse A. D Orleans	Satiny flesh pink ; very large and full	
Princesse De Beara	Deep rich crimson, tinged bright vermillon ; large, and of fine from.	
Souvenir D'Alphonse Lavallee	Deep chestnut-red ; large and full	
Victor Hugo	Rich crimson-red, shaded purple ; large	

Tea-scented.

Charles de Legrady	Carmine, passing to Chinese pink, with a silver margin to petals ; large and double	
Grace Darling	Base of petals creamy white, tinted and shaded towards edges pinkish peach ; large	
Mademoiselle Alexandrine Bruel	A pure white seedling from *Gloire de Dijon* ; large and full	
Souvenir de Gabriel Drevet	Light salmon, bright pink in centre ; well formed	
Sunset	A really fine novelty, it is a sport (but a rich tawny shaded saffron-coloured flower) from *Perle des Jardines*, nearly the colour of *Madame Falcot*, but double, as the parent	

Hybrid Tea-scented.

W. F. Bennett	Of the same colour as *Général Jacqueminot*, and, from its size and the freedom with which the blooms are produced, it has been likened to a crimson "Niphetos"	

SEASONABLE NOTES.

FERNS.

Preparation should now be made for potting the strong growing kinds ; the size of the pots being regulated by the purpose for which these useful plants are required. For general decorative purposes the Adiantums are invaluable, as they may be had in beauty all the year round, and when no longer wanted as specimens they may be split up into small pieces and grown for furnishing. To secure stout fronds for cutting, and to withstand the dry atmosphere of our houses, a large percentage of sandy loam should be used, and the plants should be grown where they can have an abundance of light, without being exposed to the direct rays of the sun. For ordinary potting, leaf-mould, loam, sand and charcoal make a suitable compost ; clean pots and crocks being indispensable. Robust varieties are best potted before the new fronds become far advanced, the more delicate kinds being allowed to start into growth before they are disturbed.

Gradually remove the old shabby fronds of all Ferns, as the young ones emerge and begin to unfold themselves, taking care, while doing so, not to injure the latter, which, in their present tender state, is easily done Watch closely while removing them, to see that the young fronds are free from brown scale, or that none of these pests become dislodged while picking over the plants, and fall where they have a chance of establishing themselves, or they will soon spread and re-stock the house with their progeny. To remove or disturb the scaly covering is only to set free myriads of young ones in the embryo state that are protected beneath its covering, and that when liberated, float about in the air, and alight on other plants. to spread again as soon as conditions are favourable. By exercising a little care now while removing the old fronds, these troublesome insects to Ferns may be, if not entirely got rid of, at least so reduced as to be kept under. Some Ferns are subject to green fly, while the fronds are young and tender, and where these occur they soon cripple and disfigure their growth. The safest and best way to eradicate them is to dip the heads of the plants in weak tobacco-water, and afterwards give them a shake, when the insects will fall off. Fumigation, if applied sufficiently strong to destroy them, would endanger the safety of the young tender shoots, and should therefore be avoided while the fronds are in their present immature state. When any fresh soil is placed in the house for the purpose of potting, or filling up the beds in which other plants are grown, it is frequently the means of introducing slugs or their eggs with it. These when hatched prey on the growth of Adiantums and other choice Ferns directly they make their appearance, and the plants are thereby seriously injured unless they are closely watched. A Cabbage or Lettuce leaf saturated with tallow, or a little bran in heaps, form a tempting bait for them ; but the best way is to search for them by candle light, examining closely the plants they visit, as they will generally be found feeding there in preference to such common fare as any of the above. It is still the practice with many cultivators of Ferns to cut away the whole of the old fronds at one time, instead of removing them piece-meal, as they become shabby, or the young ones attain sufficient size to take their place. Such a course has a very weakening effect on the plants, and is a very frequent cause of many roots perishing, thus producing an enfeebled growth for a long time afterwards. The supply of water should be gradually increased as the young fronds gain in size and root-action becomes more vigorous, a

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time when they can scarcely be kept too wet, unless the soil should happen to be unsuitable or the drainage defective.

SEEDLING FERNS.—We scarcely know of a more interesting study than that of raising Ferns from spores; it is certainly a delicate operation, and should only be attempted by those who are prepared to retain the sole charge of them in their own hands at least during the infant stages of their existence. The most critical stage is just when the growing spores have covered the surface of the soil, as it were, with a dense green mat. If at this time any appearance of decay sets in, prick them off at once or it will soon spread and the whole will be lost. In pricking off any before the young fronds are thrown up, crock the pot in which they are to be placed to within one inch of the top, then fill in very lightly with good open soil, say two-thirds leaf-mould, one of loam, and a fair proportion of sand, all finely sifted. With a pointed piece of wood take up a small mass of the young plants, lay it on the surface, and press it gently with the finger into the soil. When a pot is filled in this way, give a good watering and place it in a position where it will not be much exposed either to sun or air. If at any time a thin delicate moss makes it appearance on the soil remove it at once, for it grows so rapidly as soon to choke up and destroy all the growing Ferns.

ORCHIDS.

Many Orchids will now be found in a sufficiently advanced state of growth to admit of being either re-potted or top-dressed, for any which are well-rooted and healthy will only need the old material removed from between the roots and its place supplied with fresh compost. Unhealthy plants having few roots should be turned out of their pots, the decayed portions of the roots cut away, the foliage and pseudo-bulbs thoroughly cleansed, and the plants re-potted in comparatively small pots. In the case of unthrifty specimens of this kind it is better to place them after re-potting in a group by themselves in the Orchid-house, in order that they may be better attended to than the more robust-growing plants. Whenever new pots are selected for potting Orchids care should be taken that they are soaked in water for some hours, and afterwards drained until they are almost dry before using them; when old pots are employed, they should be perfectly clean within and without; the crocks also should be thoroughly cleansed and exposed to the air for a time before they are made use of.

PHALÆNOPSIDS.—These will now be in their full season of growth, and should be accommodated with the best light position in the warmest house. Their extremely free-flowering disposition frequently causes the production of bloom-stems at all times of the year, but it is by no means advisable to encourage their flowering whenever inclined to do so, and in the case of plants that it is desirable to grow on to a larger, stronger condition, any flower stems now produced may, with advantage, be rubbed off as soon as they make their appearance.

PROPAGATING PHALÆNOPSIDS.—When the plants have got strong and after bloom ng the extremities of the flower-stems alone were removed, leaving the lower portion adhering to the plants, these will sometimes form young plants from the joints left remaining; they should not be disturbed until they consist of a couple of small leaves, and have formed roots. When these exist they may be taken away from the plant that has produced them, put on blocks, and treated like the older examples. The handome P. Luddemanniana increases freely in this way. If, instead of increasing the number of separate individual plants, it is deemed more desirable to have larger masses, the shoots bearing these young plants may be bent round and secured to the block or surface of the pot in which the old specimen is grown, allowing the young ones in this manner to become established, and go on with the crown that has made them. This may be encouraged until the plant consists of several, say six crowns, in which way, when the whole have acquired sufficient strength, they will produce a proportionately increased number of bloom stems, having a much more imposing appearance when in flower than is possible with a single crown however strong. Young Orchid growers will do well also not to allow such species as P. amabilis and P. grandiflora to continue blooming so long or so often as they are frequently disposed, otherwise the requisite amount of leaf growth, which should be formed each season, will be non-existent, the result of which is that the plants, with their natural disposition to cast off a portion of their lower leaves, will do this without forming a corresponding or a greater quantity of new, in which case the specimens, instead of increasing in size and strength, become reduced in both.

AMARYLLIDS.—Plants of Amaryllis that are now pushing up their flowers must be well supplied with water; weak liquid manure will be of great assistance to them, especially the deciduous kinds, that make the greater portion of their leaves for the season simultaneously with the flower-stem; they sould have plenty of light, otherwise the leaves will be drawn up, a defect which no subsequent treatment through the season can remedy, and it is upon the production of the greatest quantity of healthy foliage that the next year's flowering is in a great measure dependent. The nearly-allied Vallota purpurea will now be making its growth; the soil must not be allowed to become dry, or the plants will be much injured.

CALADIUMS.—These will now be starting rapidly into growth, and where it is desired to increase the stock of any of them to as great an extent as possible, pot the corms, and when doing so take care they are covered with soil to the depth of half an inch or an inch according to size, then, as soon as the young leaf has reached a height of three or four inches, turn the plant out of the pot and remove the upper part of the soil till the corm is exposed, when it will be found that the young leaf proceeds as it were from a small protuberance thereon, and at its base there will be a number of young and vigorous roots. By the exercise of of a little care the young shoot with its roots can be cut off with a portion of the old corm attached, then pot it in a small pot and keep it close till the roots reach the sides of the pots, when it must be hardened off and grown as rapidly as possible. After being thus treated cover the old corm with soil, when after a time other buds will push forth, which, if required, can be taken off and potted as just described. As the aim is to get stout corms the first season, this mode of propagation must be carrid out as early as possible, every week's delay being a loss.

PLANTS FOR TABLE DECORATION.

Fine-leaved plants for this purpose greatly assist in economising flowers when the supply of the latter is limited, and throughout the summer months they impart a coolness and freshness to the table, both with and without flowers. Where a constant supply of plants has to be grown for this purpose it should be the aim of the cultivator to have them as varied as possible. It is also essential that they be well grown, as plants with sickly foliage, or otherwise disfigured, either by insect pests or overcrowding, will present but a poor appearance when placed on a table, where their general qualities can be seen at a glance. Therefore, whatever is grown for this purpose ought to be in the best of health. Six-inch pots should be the maximum in which plants for table are grown, and not many should be tolerated in this size. I much prefer 4½-in. pots for almost all kinds of plants, and some Palms can be grown and kept in good health in 3-in. pots, and of sufficient size and proportions to produce a good effect. These smaller-sized pots have a decided advantage in the case of some arrangements. I have at times used several plants for table work when only in very small pots. I have invariably noticed that the very common error made by cultivators for this purpose has been adhering far too much to the larger size of pot, which has frequently been out of all proportion to the size of the plant. Now I consider quite the opposite ought to be aimed at, *i. e*, to endeavour to secure a healthy plant in as small a pot as possible. Plants in such pots will require more attention in the way of watering, &c., than those in larger size, but they will not be so likely to lose their roots as when the larger size is used. When the plants become pot-bound and require extra nutrition to assist them, they should be treated to frequent waterings either of liquid manure or some artificial fertiliser. I have

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found Standen's a very useful manure, for Palms especially. By thus treating the plants, and paying attention to the cleanliness of the foliage, they can be made to do service for a long time. They ought to be changed twice or three times every week, according to their hardiness, and ought not at any time, when in the house, to be allowed to become dry at the root, for, being in a dry atmosphere, they suffer from drought the more readily.

PALMS.—The impunity with which some kinds of Palms withstand ill-treatment is extraordinary, notably those which thrive in a temperate house. Some of the most graceful kinds require stove treatment; consequently they must be used more carefully. Foremost among these stands Cocos Weddelliana, which is one of the most elegant Palms when in a small state. It can be grown of sufficient size for table work in 4-½in. pots, and even in smaller pots it is very effective. Geonoma gracilis is also a most useful Palm in a small state, and very graceful. It is, when healthy, of a deeper shade of green than the former. Areca aurea is one of the best of its class, being slender in growth and elegant in outline. A. lutescens is perhaps one of the most useful Palms we have. It can be had and grown well in small pots, and will withstand exposure to a dry atmosphere. A. Verschaffelti is also a useful sort, partaking of the character of A. aurea, but rather more robust in growth. A. rubra is a useful and hardy kind, very handy in 3-in. pots; in larger pots it is inclined to grow too freely for table work. A. sapida is very pretty when in small pots before it partakes of its more robust habit, and can be grown in a warm greenhouse. A. nobilis (or Oncosperma Van Houtteana), distinguished by its spiny petioles, is very distinct, and in a small state most useful, but it requires a higher temperature than most kinds. Calamus ciliaris, when dwarf, is one of the most distinct of Palms grown as a plant for the table. Amongst Chamædoreas, C. graminifolia is one of the best. It can be used very effectively as a centre plant for the dinner table even when 3 ft. or 4 ft. high, being very light and graceful. C. glaucifolia is also a very serviceable plant, partaking, as regards the formation of its leaves, somewhat of the character of the genus Cocos. This Palm can be grown to form beautiful plants for the table in 3-in pots. When in larger pots it is apt to increase in height rapidly, rendering it rather too tall for table decoration, but most serviceable as a general ornamental plant. Dæmonorops fissus and other kinds closely resembling it, such as D. melanochætes and palimbanicus, can be retained in a healthy state for a length of time in small pots, in which they are very useful and effective. Euterpe edulis, I think, is one of the prettiest Palms grown as a table plant in 4½-in. and 3-in. pots; its slender stem and the arching character of its fronds render it a most distinct and graceful Palm. And Geonoma pumila is also a good Palm for the table when in small pots; it is quite distinct from G. Schottiana, which is another good plant for this purpose. Kentia australis, Belmoreana, and Forsteriana are amongst the hardiest and most useful Palms which we possess, invariably retaining their healthy deep green colour for a length of time. One or other of these kinds should be grown in the most select collection. As small plants they are especially useful for the table; when larger they are invaluable as general decorative plants. They can be grown to a large size in a comparatively small pot with the aid of occasional doses of Standen's manure. Phœnix rupicola is one of the best of its class, and not so scarce as it has been. Seaforthia elegans is a useful table plant in the smaller sizes of pots before it puts on its robust habit. Among the Fan Palms, plants of the Thrinax are the most light and elegant for table, and of these T. elegans is one of the best of its class, and quite distinct from any other Palm I have named previously.

CULTURE.—It will be generally found in growing Palms for table decoration that when they become pot-bound they will be liable to the attacks of red spider, and mostly those kinds grown in a stove temperature. In order to remedy this as much as possible in the general routine of work, they ought to be well syringed overhead at least twice daily; but if the spider becomes very troublesome, it is better to resort to sponging the leaves, or to dipping the plants in a solution made from any of the many insecticides now so easily to be procured. Experience as to the different strengths of various kinds will be found to be highly essential to the cultivator, in order that he may know to what strength he may use any given sort without injury to the plants.—J. H., in *Field*.

NEW PLANTS OF 1885.

(Continued from page 174.)

STOVE PLANTS.

Amongst stove plants that are grown chiefly for the beauty of their foliage, as well as others grown exclusively for the sake of their flowers, the most conspicuous is Dracæna norwoodiensis, a variety of exceedingly elegant habit. Formerly Dracænas, as well as Crotons, were introduced in such quantities, either as original species or seedlings, that one might have thought that there was but little room left for improvement; such, however, is not the case, for D. norwoodiensis is essentially distinct from anything else in cultivation. It belongs to the class of plants whose narrow leaves, ornamented by a particular combination of colours, are highly decorative. In this case they are of a bronzy green, edged with creamy white and tinged irregularly with streaks of rosy pink. Alocasia Hendersoni and A. Sanderiana are also excellent additions to an interesting genus comprising already some highly drcorative species; the former is so entirely different from all others, that it cannot be compared with any of them. Its handsome leaves are metallic green in colour, overlaid with a satiny lustre, and about a foot in length, rather narrow, heart-shaped at the base, and gradually tapering to a point. A. Sanderiana is undoubtedly one of the most valuable acquisitions among fine-foliaged plants introduced of late years. Its leaves, which are large and deeply cut into rounded lobes, are also of a metallic green colour, relieved, however, by broad, silvery main ribs; the undulated margins of the leaf are also of an ivory-white colour. Erythrina vespertilionis is a plant of curious, yet pretty, appearance, and one which, no doubt, will be grown on account of the unusually quaint or grotesque aspect of its foliage; its peculiarly shaped trifoliate leaves are borne on long petioles; the leaflets are very remarkable and unusual in form, being obversely triangular, and their uncommon and strikingly furcate character, added to the elegant growth of the plant, renders it very attractive. Amasonia punicea, a grand plant, may be considered either as a fine-foliaged or flowering plant. It comes from British Guiana, and has leaves of elliptic lanceolate form, from 9 inches to 10 inches long, but gradually diminishing in size as the plant gets towards the flowering state, when they become mere bracts surrounding the flowers. They are as brilliant vermilion-crimson as those of a Poinsettia, and are disposed in pairs along the entire length of the flowering shoots; these bracts remain in perfection for fully three months, and, being so very numerous, render the plant extremely attractive. Three or four new Caladiums have also made their appearance, the most distinct among them being C. Comtesse de Maille, a variety with beautiful large leaves ornamented with many various tints of white, crimson, and green, arranged in the form of mottlings all over their surface; and C. Comte de Germiny, with small red leaves covered with white spots and mottled with green. In Wormia Burbidgei we have a robust shrub of erect habit and furnished with a bold and highly ornamental foliage, particularly well adapted for the decoration of the warm conservatory; its leaves, which are elliptic and of a pleasing glossy green, attain a length of 18 inches and a width of 10 inches or 12 inches.

Among fine-leaved stove climbing plants Philodendron nobile must not be overlooked; its leaves, which are of a firm leathery texture, are produced on fleshy creeping root stocks, that spread over the surface of the soil and attach themselves to trees or walls. Piper ornatum is an elegant plant with prettily-coloured foliage, and a native of Celebes, in the Malayan Archipelago. Its stems, which are slender and flexuose and of a pale green colour, are furnished with heart-shaped peltate leaves, borne on pale rosy foot-stalks; these leaves, which are produced abundantly, are bright glossy green, spotted with pale rose, the spots being densest along the nerves. It is a distinct plant, and one which will be found useful for covering walls and pillars in warm houses. The above about complete

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the list of the most meritorious stove fine-foliaged plants introduced last year, although such as Ardisia picta, Phyllanthus Chantrieri, Vriesia jansiriensis variegata, Begonia albo-picta, and several others are well worthy of cultivation. To these must be added a couple af Nepenthes, both particularly ornamental. The most distinct of the two, N. cincta, is a new kind recently imported from Borneo, and supposed to be a hybrid between N. Northiana and albo-marginata. Its pitchers measure some 9 inches in length; they are of proportionate breadth and beautifully coloured with a vinous tint, on which may be noticed copious irregular blotches of claret colour. Though, perhaps, not quite so distinct as the preceding kind, N. Rafflesiana insignis may be considered as a magnificent variety of robust growth, producing handsome pitchers; also about 9 inches in length by about 4 inches in breadth, obliquely flask-shaped and heavily mottled in an effective manner with purplish-brown on a bright green ground.

Flowering Stove Plants.

Independently of the several Amaryllises and Rododendrons of the Javanese section which are yearly produced by the hybridiser, the list of new flowering stove plants contains some remarkably good acquisitions, some of which will, undoubtedly, hold their ground for many years to come. The additions to the sections of stove climbers are particularly good. Camoensia maxima, a native of West Tropical Africa, which produces the largest and most magnificent flowers known in the Leguminous Order, must occupy the first place among new comers. Its pendulous milk-white flowers, tinged with gold on the edges of the petals, are produced in drooping racemes from the axils of the trifoliate leaves; all the petals are white and delicately frilled at the margin, where they are further ornamented by a golden yellow tint. In Aristolochia elegans we have also a remakable new species, the flowers of which are handsome in form and quite devoid of disagreeable odour. Bignonia regalis and Clerodendron delectum are likewise handsome climbers, especially the former, whose flowers are large and bright yellow and red; while the two Dipladenias, Lady Louisa Egerton and Thomas Speed, are two equally desirable acquisitions. Both have flowers measuring from 6 inches to 8 inches in diameter; those of the former are white suffused with pink, while the ground colour of those of Thomas Speed is a rich rosy crimson with a ray of blush white in the centre, and margins of the same colour. The eye, too, is golden, flaked with red.

Amongst other flowering stove plants Eucharis Mastersi is one of the best. It is different from all other known Eucharises, but comes nearest to E. Sanderiana; its blossoms, which are of snowy whiteness and produced in clusters, consisting of from six or eight on each stem, are about of the same size as those of E. candida. Epiphyllum Russellianum Gærtneri has very little in common with the many varieties already in cultivation: not only are its flowers differently shaped, but their colour is of a particularly vivid red similar to that of the finest Phyllocacti. In Billbergia nobilis we have one of the most beautiful of Bromeliaceous plants. Several other meritorious plants also deserve notice, such as the new Crinum Sanderianum from Sierra Leone, the curious Arisæma fimbriatum from the Philippine Islands, Ixora eminens and I. Gemma and Imantophyllum Distinction. Of Gloxinias the two best are undoubtedly Flambeau and Marchioness of Abergavenny; the latter has beautifully formed, large, erect flowers with a white ground copiously spotted with purple. The flowers of the former, if not superior in size or shape to older kinds, are, to say the least of them, most attractive. Among Amaryllises, Lady Howard de Walden is a distinct and chastely beautiful variety, with large flowers of good substance and of the purest white imaginable. Paragon, too, is a grand variety, strikingly different from the one just named; its flowers are brilliant scarlet.

Rhododendrons of the Javanese section, which now occupy a prominent position amongst winter flowering plants, are well represented. Pearl produces large trusses of wax-like white flowers, delicately tinged with rose; the flowers of Apollo are of a peculiar soft orange-cerise colour; while cardinale produces large trusses of blossoms of the richest scarlet-crimson, and Militare some of a brilliant and highly attractive orange-red. The prettiest, however, of all is perhaps Minerva, which bears massive trusses of large, well formed flowers of a delicate apricot colour.

Ferns.

To stove and greenhouse Ferns there has been added several plants of great merit. What Fern, old or new, could be more beautiful than Davallia tenuifolia Veitchiana, from the Straits Settlements? It has most graceful and finely-cut fronds, which attain a length of from 2½ feet to 3 feet, and are elegantly arched. It is one of the best basket Ferns ever introduced. Then there is the lovely Nephrolepis Bausei, at once the most distinct and handsome of its kind. It is distinct from any other Nephrolepis now in cultivation owing to the pinnæ being bipinnatifid instead of entire, as is the case with all other species and varieties of this genus at present cultivated. This character adds considerably to the peculiarly graceful appearance of the plant. Three new Maiden-hairs have made their appearance during the past season; one, Adiantum Collisi, is a plant of fine proportions and graceful habit, somewhat resembling in general aspect the popular A. tenerum, to which, however, as a decorative plant it will prove superior. In Adiantum macrophyllum bipinnatum we have a form imported from Jamaica and generally admired for the peculiar red tinge of its new fronds, which, in the typical form, are simply pinnate; whereas those of this new variety become bipinnate in the lower part. These fronds grow to about 15 inches in length, and in their young undeveloped state partake of the same beautiful colours that are common to the ordinary A. macrophyllum. A. Weigandei is a plant of comparatively small dimensions in the style of A. decorum, but differing from it in the form of the pinnules, which, in some instances, are cut like the leaves of a Hawthorn. The charming Davallia fœniculacea, from the Fiji Islands, will also prove an acquisition as well as the curious Lomariopsis buxifolia, an elegant little climbing Fern of small dimensions. The most curious and interesting of all the Ferns of last year's introducing is, however, undoubtedly the strange Cyathea divergens, a graceful Fern having, apparently, no connection with other members of the same genus.

Cool Greenhouse Plants.

To this class of plants have been added Rhododendron Manglesi, a hybrid produced by intercrossing R. Aucklandi and R. album grandiflorum. Its beautiful flowers, which are produced in dense globular trusses, like those of ordinary hybrid varieties, are pure white, very large, and open, like those of R. Aucklandi; besides the beauty of its flowers it is also to be recommended for its vigorous and free growth, which is equal to that of any Rhododendron in cultivation. Blandfordia flammea is, perhaps, the best of that genus; its bell-shaped flowers, which are about 2½ inches long, are of a dull red colour, tipped with bright yellow. In Gastronema hybridum we have also a most interesting plant, produced by the intercrossing of G. sanguineum with Vallota purpurea; the hybrid thus produced is intermediate between the two parents. Abutilon Golden Fleece is an excellent acquisition, not only on account of its rich golden colours, but principally because of its fine habit and floriferous properties. It is not at all an uncommon thing to see plants of it about 12 inches high in 5-inch pots completely covered with flowers. Of the several Azaleas which have made their appearance during last year, A. Elise Lieber and A. Prince Baudoin are the most striking; the former has large, open flowers, pure white, marked with streaks and spots of purple.

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The latter has finely formed flowers, of an intense crimson colour. A very handsome Camellia, named Commendatore Betti, has fine double flowers, probably as large as those of any yet raised. It is also beautifully imbricated and of a soft carmine pink colour. Two Sarracenias complete the list of the most meritorious of new greenhouse plants; these are S. Courti and S. Patersoni; the former is a very beautiful hybrid produced by the crossing of S. purpurea and S. psittacina. The young pitchers have a bright crimson-purple ground, veined and reticulated with deeper crimson-purple. S. Patersoni, also a deeply coloured hybrid, is a cross between S. purpurea and S. flava; both have erect pitchers.

Florist's Flowers.

To these some excellent additions have been made. In Auriculas, a green-edged variety named Mrs. Moore may safely be pointed out as the perfection of a first rate show Auricula. Amongst alpines, Miss Mollie has large flat pips of excellent form, with reddish-chocolate ground and a rich golden centre. Begonias, though now numerous, have still produced several excellent forms, foremost among which may be named Earl of Beasborough, a single-flowered kind of pleasing colour. King of Crimsons is another equally worthy single Begonia, with unusually large and finely shaped flowers of the richest crimson imaginable. Among double-flowered forms, Lillie, with superb deep pink flowers; Marchioness of Lothian, with large very double scarlet flowers; Gabrielle Legros, Blanche Duval, and others are fine sorts. The gem, however, amongst them is undoubtedly Picotee, whose cherry-red petals have a well-defined edging of white, giving the flowers a distinct and unique appearance. John Heal, produced by crossing the curious-leaved B. socotrana with one of the tuberous-rooted Begonias, is a grand hybrid; it has a graceful habit, and produces in profusion flowers deep rosy pink in colour and brighter than those of B. socotrana. Among the several Carnations brought out during last year, Pride of Peasburst, with flowers of a moderate size and of a clear, rich yellow, is one of the best; while in pale colours. The Governor, with full, large flowers of a delicate blush white, is unquestionably one of the best yet raised. Of a dozen Dahlias or so which have been awarded first-class certificates, most of them are double-flowering varieties, and all exceedingly good. Mrs. Hawkins, clear yellow and less formal than those of the ordinary show varieties, is well worth attention. Over twenty Gladioli received first-class awards, and although some really good things are to be found among the home-raised ones, the most distinct belong to the Lemoine group, a new race produced by intercrossing G. purpureo-auratus and others. Of these, the most striking are Masque de Fer, a kind with intensely rich red flowers, the lower petals of which are flushed with maroon-crimson; André Chénier, with flowers of a rich crimson-lake, flushed with purple; La France, pale pink, flushed with crimson, lower sepals deep maroon-crimson and broadly tipped with yellow. Among many excellent new Pelargoniums, the Ivy leaved section appears to have produced the most striking novelties. Rubens is one of the finest, its truss is large, as are also the flowers individually, which are cherry-crimson in colour. Souvenir de Charles Turner is particularly remarkable for the rich colour of its flowers, which are very double, borne in large trusses, and of a pleasing carmine-magenta tint. Amongst new Primulas, White Perfection seems to be the best; its flowers, which are pure white, are exceptionally large, of good substance, and produced in large trusses.

Hardy Herbaceous Plants

Amongst these the most interesting are the following: Eremurus aurantiacus, a new Asphodel-like plant from Central Asia, which, if perfectly hardy, will prove to be very valuable. Its flowers, which are clear yellow, are borne on cylindrical spikes, which, through being thickly covered with blossoms, have a feathery appearance. They measure about 12 inches in length. Helenium autumnale pumilum is also a first-rate hardy perennial, and one of the finest of dwarf yellow Composites; it differs essentially from the typical species in size and also in floriferousness; its flower-heads, which measure about 2 inches across, are of a bright rich orange colour, and are produced abundantly, even on very small plants. Dodecatheon splendidum is certainly the finest of all the North American Cowslips. The whole plant is barely a foot high, but the flowers, which are highly attractive, are of a particularly beautiful deep carmine-crimson colour. It cannot, therefore, well fail to become popular, especially as it is of easy culture. Dracocephalum virginicum album is a pure white-flowered variety of a North American plant, which it in all respects greatly excels. It is dwarf and bushy in habit, and produces in profusion dense spikes of flowers, which, opening simultaneously, are very effective. Saxifraga lantoscana superba and Macnabiana are also acquisitions, as well as the white Spiræa palmata alba.

Among new trees and shrubs the most noteworthy are: Chionanthus retusa, the Japanese Fringe tree, a pretty shrub with deep green ovate leaves and clusters of white, star-shaped flowers borne in abundance. Ligustrum sinense floribundum is particularly remarkable for its florifer. ousness, each branch even in quite young plants being densely laden with small sweet-scented white flowers which open in July. Olearia Gunni and O. mocrodonta are two pretty New Zealand shrubs that produce in profusion small Daisy-like flowers in May and June. In Schizophragma hydrangeoides we have a very curious Japanese shrub much resembling a climbing Hydrangea, and Styrax japonicum as well as S. californicum are two excellent additions to our list of spring-flowering shrubs; the former, which has proved perfectly hardy near London, produces long, slender shoots furnished their whole length with snow-white, bell-shaped flowers that are deliciously fragrant.

LONDON OFFICE

OF

THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

1, Whitefriars Street, London, E. C.

Correspondence.

TO THE EDITOR OF THE "INDIAN GARDENER."

Sir,—Oblige me by giving me information in the next number on the following points:—

(1) I find a number of Rose bushes in my gardens, where evidently pruning has been neglected; the Roses, hybrid perpetuals, have numerous rods of all sizes, and have become huge bushes having small flowers. Can I with safety (in a dry district) at this season of the year, or at commencement of the rains, thin out these plants?

(2) Is there a Croton called Gibsoni? If not—what is the name of the plant with leaves 6 or 7 inches long, ½ inch broad, habit dwarf—markings exactly like those of Aureo maculata.

(3) Would Marantas thrive in a dry district?

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(4) During January and February the Malmaison plants throve, looked healthy, produced lots of buds, but the latter either refused to open, or dropped off, or opened with a diseased centre. The Marechal Neils also had nearly all their flowers with diseased centres. What was the cause?

Yours faithfully,

W. V.

Purneah, 6th April, 1886.

NOTE.—I.—The Roses may be pruned with safety at the commencement of the rains. The best way would be to cut out all the old wood, leaving last season's growth as intact as possible (*i.e.* vigorous shoots from the base.)

II.—We know of no Croton named Gibsoni; possibly it may be of local origin. The variety nearest approaching to the description given is Macarthuri No 11. If you will send us a well coloured matured leaf, we shall be in a position to name it without doubt.

III.—Marantas would thrive very well in your district, provided they were kept in a cool shady position.

IV.—Souvenir de la Malmaison, and in fact nearly all Bourbon Roses, are subject to the disease mentioned. In our opinion it is generally due to an excess flow of sap and extreme floriferousness. It is rarely if ever met with in varieties that produce fugitive flowers. The best remedy is to thin out the buds directly they appear, leaving one, or at the most two, on a shoot.—ED., *I. G.*

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to should be sent in not latter than the Friday previous to the day of publication. All communications should be written in one side of the paper only. It is also requested that correspondents forward their name and address not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

HYBRIDIZATION.

METHODS, ADVANTAGES AND DISADVANTAGES.

WHAT IS A HYBRID?

The common definition of a hybrid is good enough, viz: the offspring of the seed produced by the intermingling of the reproductive male germ of one species with the reproductive female germ of another species of the same genus. The individual bearing the hybrid seed, or offspring, always furnishes the female germinal spore, called an ovule, and if a plant, is said to be *fertile*; if an animal, *a female*. The individual bearing the male germinal spore,—in plants called a pollen-grain, in animals spermatozoon—if a plant, which bears nothing but pollen grains, is said to be sterile; if an animal, a male.

WHAT IS A SPECIES?

Even among scientists, there are different definitions of species. Generally, those holding the origin of species to be a direct creative act, define species as a group of individuals descended from a first parent or pair of parents, which were created fully formed, ready for reproduction, with seed in themselves of their own kind; and that they cannot intermingle with other species, and that they always maintain their identity as a species; yet they illogically admit varietal changes, and that the different branches, or varieties of a species, can intermingle and thus produce crosses. This ignores the facts of comparative anatomy and the possibility of hybridization.

On the other hand, those holding that species are only old, much multiplied and long separated branches, or varieties of a still older branch termed genus, would generally define species as a group of individuals, every one of which embodies, in common, typical characteristics not found in members of any other group or species, yet each possessing in addition individual markings. These markings may be transmitted; and if transmitted continuously in a certain direction for a time till they become typical of a group of individuals, this at first, or while a young group, is called a variety or breed, and when intermingled with another variety of the same species, the product is termed a cross. And the individuals of a species occurring by natural distribution over a large area, or in great numbers, and the entire group possessing great antiquity of origin, all related to a common parent, either as a variety or hydrid at first, in the remote past. Even this definition could not cover each individual case, as points would be found often where one species would be linked fast, or merged into another nearly allied.

According to this view, which certainly is supported throughout the realm of Nature, both in anatomical structure and variation, varieties are only embryo species, which freely intermingle as crosses. Species are young genera, often, not always, intermingling, producing in some cases perfect hybrids capable of reproduction, such as the numerous hybrid Grapes, Whitney No. 20, and many of Gideon's Crabs, also many cultivated flowers; but occasionally producing infertile varieties or hybrids, such as the mule, and hybrids between Plum and Peach, and other known cases. These latter occur between species so widely diverged that their anatomical structure permits with great difficulty the intermingling act, and the offspring is generally incapable of reproduction. Their view is based upon change and time. Admitting that change according to the conditions of their surroundings, and that time is infinite, the changes, be they ever so little at a time, added together an infinite number of times, and infinite variation in structure, function and relationship necessarily results.

According to the first view, an individual, created a dog, a horse, a plum or a peach, must ever remain such, identically, or specific creation would become undone, and unrecognizable. By their view, a mule, or a Blackman Plum (a hybrid between Peach and Wild Goose Plum), would be anomalies, miracles; but according to the second, they would be natural, legitimate, necessary results. This view opens the grandest, the only field of development, in which we can with certainty expect advancement. The other view can have development only through miracle, and that can come by no human process. Even those of the creative theory blindly practice the development theory, for they can do nought else. Then does it not become us to learn the principles of development well?—*American Garden.*

NUTMEGS, BETEL-NUTS, TEAK AND FRUIT AT SINGAPORE.

There are now planted out in Singapore, as nearly as can be discovered and estimated, about twenty-five thousand nutmeg trees. In this number, there are about four or five hundred which have been bearing for considerable terms of years, including about two hundred or so from 18 to 21 years of age. The remainder consist of trees of all ages downwards, from about eight or ten years of age to one. The land occupied by these trees may be from about 550 to 600 acres. In the whole collective area there is only a very limited proportion of the best, but a large proportion of the worst soil.

It has become fashionable in these Eastern Isles where the imagination like the jungle, is so apt to luxuriate, to pitch upon some trees of uncommon growth, and situated in the most favoured spots, as standards of comparison, and as sure indices of prospective wealth, in a species of cultivation which, beyond all others, demands the soberest exercise of the judgment, and the most liberal sacrifice of preconceived opinions and exaggerated expectations, before we can venture on a computation of the probable—certainly always more or less uncertain—results. Like most fruit trees, some nutmeg trees will bear large and others scanty crops. The annual rent will always vary considerably, for a full crop can hardly be expected beyond once in three years,

The betel-nut tree deserves consideration, for although it would not be worth the while for a capitalist to speculate upon it, still, as the nut is exportable, it is of more value than produce which must, from its perishable nature, be consumed on the spot. It is a hardy tree, and only requires to be kept free from the lalang grass and jungle for two or three years, after which it will afford sufficient shade to prevent that grass growing strongly.

I have already noticed that Straits fruit trees promise well generally. The base of the hills, and gentle slopes, and undulations are well suited to them. The mangosteen seems to thrive on the flat clayey land, while orange trees, the pumunelo, jacks, durians and others will be best planted on other sites. Some of these trees, the jack for instance, thrive well on the stony red iron soil. But it is obvious, with the acknowledged superior fruits of Malacca so close at hand, that the cultivation of unexportable fruits should be gauged by the number of local consumers.

The cinnamon tree may yet come to the aid of the planter. It has been introduced on the island, and thrives very well, but a very small number of trees only have as yet been planted out.

The cocoa, or tree yielding the chocolate bean, may be advantageously cultivated here. It has been long acclimatised in Penang, and chocolate of a fair quality is manufactured for the use of the Roman Catholic Mission by its padres. It is a hardy tree, and seems to grow wherever it has been planted there, both on the hills and plains.

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The teak tree thrives at Singapore, and might be usefully employed along with the cocoa tree to line the boundaries of estates.

The pine-apples of Singapore and the islets in the vicinity, are of a superior quality. They are large, sweet and well-flavoured, and they are cultivated in such abundance up the steep sides of these hilly islands, that they are sold in the market for one-third of a cent of a dollar each, and are thus eagerly consumed by the lower classes. But it is not a wholesome fruit, and, doubtless, it assisted the cholera in the ravages it made here last spring when it is believed from six to seven hundred natives died of that dire disease. Several European seamen died on board the vessels in the harbour, but only one died on shore, and his habits were intemperate.

The pine-apple grows best on the arid rocky slopes, on the worst red soil, and it partakes outwardly of this red colour. If the pine-apple fibre comes into repute in England, which it is likely to do, then there will be a wide field here for its manufacture.

The Agricultural Society has not effected anything as yet in the horticultural department, which, I believe, it was intended that it should embrace. The Chinese and Malays raise in their own way all the vegetables which are brought to market. These are sweet potatoes, bad yams, kaladie, or the arum colocasia (of R) which is cultivated in swampy places. The root is single, oblong and bulbous, and it is eaten as a substitute for the potato. The stalks and leaves are sold as fodder for pigs. A few inferior cabbages are grown from sprouts by dint of stimulants which shall be nameless. Celery is also grown, but the root is not sold in the bazaars, the leaves only being so; and this absurd way of using this vegetable is patiently endured by the consumers, who will, it seems, consent to pay a high price for English preserved vegetables, which, for aught that has been proved to the contrary, might by the offer of premiums, and by a modicum of instruction have been cultivated at their own doors. It may be said that these will not grow here. So it was said long ago at Calcutta and Madras, yet perseverance has overcome every obstruction at those Settlements. The native vegetables are rather small, yet they are of good quality, and for a garden of a moderate extent, a soil can readily be made to suit every species which the climate will permit to grow. From all that has been stated, it would appear that the cultivation of this island is still in its probationary period. The Chinese have been shewn to be the chief cultivators, but then they have no attachment to the soil. Their sole object is to scourge the land for a given time, and when worn out to leave it a desert.

And what, we may inquire, what is to become of the thus impoverished land covered with the jungle they leave in the rear on their onward progress over the island. A fifty years fallow would barely return it to its pristine condition; and what agriculturist would be so rash as to embark on a large scale in the attempt to renovate it? In short, it seems clear, that if no general cultivation of a more permanent nature than pepper and gambier can be advantageously established, the forest must ultimately reassume its dominion. Unfortunately, there is no rice land worth mentioning which might induce a settled Malayan population. The only remaining chance therefore would seem to be the planting of cocoanut, areca, and other indigenous fruit trees and incorporating them gradually with sugar cane and trees yielding an exportable produce. As the case stands, it is clear that if there should be any considerable prolonged fall in the prices of pepper and gambier, the cultivation of these articles, and consequently of the greatest cultivated portion of the island would cease.

The area of the Island has been stated at about 12,000 acres. But as far as the above two products are concerned, the quantity of land available for them might not be reckoned at above one-fourth of the whole, supposing that pepper and gambier must continue to be cultivated together and cannot prove profitable separately. Because the proportion of pepper land is much smaller than that suited to gambier. Then a very large deduction would be required for the jungle land which must be attached to each plantation for the supply of fuel. When the whole lands on the island and in cultivation shall have been measured and the nature of the remaining portion shall have been ascertained, a correct estimate may be made of the period after which pepper and gambier will cease to be cultivated. For it may be remarked that these plants or trees cannot, until a long period of years has elapsed, be successfully raised a second time on the same soil.—*Singapore Free Press.*

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Editorial Article.

THE NATURALISATION OF PLANTS.

In its strictest sense naturalisation may be understood to imply such an adaptation of the habits of plants or animals in a particular country that, if left to themselves, they will flourish and propagate their species almost or quite as freely as in their native habitat. With regard to vegetable productions, however, no such extended scope can be allowed to the word. Its use here is simply to express that modification of constitution or development by which certain species, inhabitants of warmer or cooler climates, as the case may be, are enabled to sustain the changes of our climate, and to thrive uninjured either in the open ground or under such artificial conditions as can be applied to them.

Whatever doubt may exist as to the possibility of effecting the complete acclimatation of any plants, the fact is beyond dispute that the limited alteration just mentioned has been accomplished in innumerable instances. It is a matter of no importance whether the organization of a plant is or is not affected during the process, or whether its powers can be radically changed; all that need be urged is that, although when first introduced, many species retain habits, periods and modes of growth, a tenderness of tissue and a consequent susceptibility of damage which imperatively call for shelter or protection during several months of the year; they will after a longer or shorter exposure, and often by a little timely and judicious assistance from the cultivator, so conform to the natural seasons, and so regulate the exercise of their functions by the ordinary vicissitudes of temperature, as to become capable of dispensing altogether with the aid of art, except in a rare and remarkable combination of adverse circumstances.

A remarkable instance of this is afforded us in the Croton family—a genus which has in Bengal and many other parts of India found a home in every way congenial to them—in many instances thriving even more vigorously than they do in their native habitat, that is, when once firmly established. But no one who has not had experience in importing new varieties can have any idea of the difficulties to be encountered in acclimatizing them. In the first place the original imported plants can never be induced to make good specimens, being almost invariably weak and sickly, and it is rarely before the second or third generation propagated from them, that the varieties show their true characteristics. To thoroughly inure them to our climate it takes on an average from five to seven years, that is, before they can be planted out in the open air. Take as an illustration such varieties as *C. maxima*, *C. Hookeri*, *C. nobilis*, *C. undulatum* and *C. interruptum*, which now thrive in our gardens in the open air quite as freely as that grand old variety C Pictum, but which, twelve or fourteen years ago, were quite as delicate as *C. Musaicus*, *C. Bernardi*, *C. Emperor Alexander*, and

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other varieties of recent introduction. Those of us also who can look back to the time when *Aralia Guilfoyler* was first introduced, must remember what a delicate little mortal it was then, and how, as each succeeding leaf appeared on the plant, it would almost invariably drop off, and that it could only be propagated with extreme difficulty. Now it is one of the hardiest shrubs in our gardens, and it is no uncommon thing to see plants of it twelve or fourteen feet high and seven or eight feet through, and we might give innumerable instances to the same effect.

Undoubtedly during the past few years much has been done in introducing and acclimatizing many choice species and varieties of ornamental foliaged and flowering plants previously unknown in our gardens, but what has been accomplished is infinitely small when compared with the work that still remains to be done. There are undoubtedly thousands of species and varieties of plants that, if introduced into our gardens, would with a little fostering care eventually become thoroughly naturalized. Hitherto the work of importing new plants has been almost entirely carried on by our nurserymen, very few private growers caring to venture into the regions of the unknown; and this fact accounts for the limited number of genera generally found in cultivation. The tradesman looks at the subject necessarily from one point of view only, and that is a financial one; consequently he confines his attention only to those which in his opinion are likely to give him a fair return for the risks incurred. He is aware that by importing new varieties of any genus already well known to and popular amongst amateur growers, he is certain of a favorable result; but let him introduce varieties of any new or unknown genus, and in all probibility the venture from a financial point of view will be a failure. Take for instance Dutch hybrid Amaryllis, the wholesale price of the best new varieties is frequently as much as sixty to seventy-five shillings each for single bulbs; or again, Bleu's French Caladiums, which when first introduced varied in price from forty to fifty francs for small bulbs. Now neither of these genera, although thoroughly established and thriving vigorously in our climate, can be said to be popular with amateurs, and consequently any attempt to introduce them as novelties could not be successful.

The amateur importer is unfettered by any such considerations, he does for pleasure what the former undertakes for profit, consequently he can afford to be far more venturesome in his experiments, and by so doing is far more likely to attain the object he seeks, for there will certainly be more pleasure derived in successfully acclimatizing any genus or species hitherto unknown, or more especially one that had previously resisted all attempts to inure it to our climate. It may further be urged that the effort of the amateur is more likely to meet with success than that of the professional, and for this reason that he is enabled to devote more care and attention to them.

Some authorities go so far as to assert that with proper care almost any genus may, in course of time, become thoroughly naturalized in any climate; this, however, we certainly do not believe, although, in our opinion, there is a much wider field from which we may make a selection than is generally imagined. To choose species or varieties however, the exercise of sound discretion is requisite. In the first place care should be taken that the kinds selected are sufficiently beautiful to merit distinction, and that from the latitude of their native locality, or the height at which they are found above the level of the sea, reasonable grounds be afforded for believing that the experiments will result favourably: one important condition must not, however, be forgotten. When a great discrepancy exists between the temperature of the country in which they are to be naturalized and that from whence they are brought, unless their habit is dwarf, and their growth slow and easily perfected, there is a great probability of failure. Small plants are decidedly the best for experimenting upon. Independent of the facility with which they can be protected, their inferior value, and the smaller space they occupy; they can accommodate themselves with less difficulty to any peculiarities of climate than older specimens, and their habits will be more completely conformed to the circumstances in which they are placed. In a former article on this subject, (page 85 vol. I.) in which the treatment of newly imported plants was fully detailed, we gave a list of many desirable genera that could probably be introduced successfully into this country. For the information of those of our readers who have not had the opportunity of perusing the same, we reproduce it here.

The name of each genus only is given. It would, of course, be impossible to give a list in detail of every variety. Some of those mentioned have already found a home here, but in the majority of them, we have only one or two solitary varieties, and those not of the best, and many of the species enumerated have never yet been introduced at all :—

Abutilon	Cyanophyllum	Nepenthes
Acmena	Cyphomandra	Nerine
Æchmea	Cyrtoderia	Nœgelia
Agave	Dieffenbachia	Panax
Allamanda	Dioscorea	Pancratium
Alocasia	Dipladenia	Passiflora
Alpinea	Dracœna	Philodendron
Amaryllis	Erythrina	Phyllanthus
Amorphophallus	Ficus	Phyllotœninum
Anthurium	Franciscea	Pothos
Aphelandra	Gardenia	Pleroma
Aralia	Gesnera	Ronnbergia
Ardisia	Griffinia	Ruellia
Aristolochia	Gustavia	Strelitzia
Asparagus	Habrothamnus	Sarracenia
Begonia	Hœmanthus	Schismatoglottis
Bertolonia	Heliconia	Sonerila
Bignonia	Hibiscus	Spathiphyllum
Billbergia	Hoffmania	Tacsonia
Blandfordia	Imatophyllum	Tecoma
Bomarea	Ipomea	Tillandsia
Bouvardia	Ixora	Thuja
Brownea	Iris	Thujopsis
Clerodendron	Kœmpferia	Thunbergia
Coleus	Lapageria	Tradescantia
Crinum	Magnolia	Tydœa
Curcuma	Maranta	Vitis
Curmeria	Musa	Vriesia

In addition to these there are an immense number of other plants, besides Orchids, Ferns and Palms that with us would find a congenial home, but which unfortunately at the present time are almost unknown in this country.

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Editorial Notes.

It has been estimated that one plant of the red poppy bears 50,000 seeds; one sow thistle, 19,000; one corn-cockle, 200,590; the charlock, 4,000; a groundsel, 6,500; and the black mustard, 1,200.

Rye.—It is usually thought that wheat is the most nutritious of all our cereals, and this opinion is current in almost all works relating to food. Recent investigations by Professor Wanklyn and Mr. Cooper appear to show the contrary. They give the first place to Rye. Rye contains more gluten. It is one-third richer than wheat. Rye, moreover, is capable of thriving in almost any soil.

Robbing Birds' Nests.—A lecture was recently delivered in which an estimate was formed of the damage to crops by the robbery of a nest of five eggs. It was stated that during the first month each young bird eats on an average about fifty-eight flies or other insects in a day. The aggregate, multiplied by thirty for the month, makes 7,500 insects to every nest. Every insect eats daily from blossoms and leaves an amount equalling its weights until it reaches maturity.

The fabrication of flower-pots from a mixture of cow-manure and earth is now extensively practised in North Germany. As many as 16,000 were used in one establishment. For forcing they are recommended; they are well adapted for nursery work, for plants raised in pots, and afterwards turned out pot and all. The roots of plants penetrate the sides of the pot, and extract some nourishment from them. They are easily and rapidly made by simple machinery.

Vegetarians in Germany.—The vegetarians of Germany have founded a pension and a colony for people of their way of thinking at Gernsbach, in Baden, where also orphan children committed to their care will be brought up on vegetarian principles. A roomy mansion known as Thalysienhof was purchased for the purpose, together with extensive fruit and vegetable gardens, and here its new occupants intend to prove by demonstration to their carnivorous neighbours how health may be attained at infinitesimal cost without animal food,

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Raising Seed in the Dark.—Sow the seeds in the usual way, cover up and keep in total darkness until they begin to peep above the soil, then gradually expose them to the light. For years past excellent articles have been written, advising shading seed-pans with paper, various coloured glass, &c., none of which methods approaches this system in merit, and why it has not become a general practice long since I am at a loss to say. The advantages and success of this system are so apparent that it only requires to be once known to become universally adopted; when a frame is covered with mats it ensures uniform moisture and temperature, consequently every seed possessing life will be sure to grow.—*H. Cannell and Sons.*

Horticulture in Nebraska.—Nebraska carried off the prize from all other States for her fruit several years ago, and she deserves it. The State has always taken an active interest in fruit culture, and it now keeps it up, as we see by the programme of a meeting of the State Horticultural Society held at Lincoln in January last. Liberal premiums were offered for winter Apples and Pears, and also for flowers, and a number of interesting addresses were given. The State is divided into six fruit districts, and reports were made from each. The prominence of Nebraska as a fruit-growing State is largely due to the efforts of this Society, and the success of the Society is largely due to the active interest of its President, Governor R. W. Furnas.—*American Agriculturist.*

An American Orchid Collector.—On several occasions during the past year or two our readers have been indebted to Mr. Ernest Morris for curious and interesting information touching the natural history of the Amazonian forest regions communicated in his letters to the *World*. Mr. Morris lately returned to this city, bringing a large number of rare and valuable Orchids, which he has collected for Mr Corning, of Albany, N. Y., whose collection is valued at more than $100,000. and is considered the finest in the United States. Mr. Morris expects to return to his Orchid collecting in South America, probably in Columbia and Ecuador. With the genuine explorer's feeling he says: "The valley of the Amazon is too civilised for me, and I want to get off the beaten track. When I come across an empty beer bottle hung up as an ornament in an Indian hut it makes me feel as though I was too near home."—*Scientific American.*

Improving Plants by Pinching and Pruning.—"How shall I grow my plants compact or symmetrical in form?" is a question frequently asked by amateur florists. It is a simple matter, and is accomplished by judicious pruning and cutting. In nearly all kinds of flowering plants, excepting those grown from bulbs, also in trees and shrubs, buds are formed at the axis of the leaves along the stem or branches, while the growth proceeds from its termination. This, in perennials, if not checked, continues to grow, and usually causes a tall or unshapely form, but, by cutting off at any point, or pinching out the terminal buds, new shoots start out at the leaf-joints below the cut, or, if already started, result in a better shaped or more bushy plant or branch. Pruning or pinching should be more generally resorted to than it is; for by observing the principle of growth just alluded to, and varying the pruning to suit the plants, it is just as easy to have them, either in the house, or conservatory, or garden, of fine form as to have them otherwise, and they are so much more rewarding and agreeable to work among. Little danger exists of cutting away too much; persons who resort to pruning frequently err in cutting too little. Old plants with long, leafless branches may be entirely re-shaped by severe pruning.

Manures.—The amount of manure employed per acre of land differs much according to the material used, and the land on which it is to be put. In the Lothians, farmyard manure, when used alone, is employed to the extent of 20 tons per acre, and from that up to 25 or even 30 tons per acre; dissolved bones, 6 to 8 cwt. per acre; dissolved bone ash, 7 to 9 cwt. per acre; and mineral superphosphate, from 8 to 10 cwt. per acre. The phosphatic and nitrogenous, or incomplete manures, may be advantageously employed together; the phosphatic being ploughed in and the nitrogenous applied in spring as a top-dressing. Mineral superphosphate or dissolved bone ash (5 cwt.) and nitrate of soda (2 cwt.), will be found a useful mixture; and where farmyard and dissolved bones are to be used together, 15 to 20 tons of the former, with 5 cwt. of the latter, will prove efficient. Fish guano may be used along with farmyard manure, in which case 5 cwt. of fish, with 15 tons of farmyard manure, forms a good mixture; or the fish guano, to the extent of 6 or 7 cwt., with 7 to 8 cwt. of dissolved bones, will be found to yield good results. For top-dressing, sulphate of ammonia is employed to from 112 lb. (1 cwt.) to 200 lb. per acre, or nitrate of soda from 154 lb. to 275 lb. per acre, that is in the proportion of 550 of nitrate of soda to 400 of sulphate of ammonia With sulphate of potash 2 cwt. will form a good proportion.—*W. Ivison Macadam, F.C.S.*

Experiments with Seeds.—Dr. Sargot, of the Botanical Society of France, has lately made some interesting observations on the germination of seeds which have not attained their complete maturity, but the embryo of which has already been formed. To measure the degree of non maturity, he simply estimated the

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weight of the unripe seeds which he sowed in fractions of the weight of ripe seeds of the same species. Then he sowed, in good condition as regards soil, temperature, and moisture, seeds weighing one-half, one-third, one-fifth, &c., of what they would weigh at complete maturity. In general he has found that the least ripe seeds are those which germinate the most slowly. The young plants resulting from them remain for a long time stunted; but they ultimately attain their normal vigour. There is not a minimum weight below which a seed ceases to germinate, and which is general for all the species. Thus the Polygonum orientale, according to Dr. Sargot, cannot germinate at one-fourth of its normal weight, while Pisum sativum still germinates at one-tenth and one-twelfth of its weight. Lastly, he has succeeded in causing to germinate seeds of wheat gathered in July, still green, and with milky perisperma, thus confirming, in a remarkable manner, previous observations made by M. Duval-Jouve and others.

THE HARDIEST GUM TREES.—Young plants of the Tasmanian Eucalyptus coccifera are reported to have borne 17° of frost in France this season without receiving any injury. This species is doubtless one of the hardiest of the genus, as it inhabits the summits of mountains 3000 ft. to 4000 ft. high in Tasmania. It has long been cultivated in England, and it was figured in the "Botanical Magazine," plate 4637, in 1852; Sir William Hooker there says, "It forms a most graceful tree, 20 ft. or more high, in the gardens of Mr. Veitch [presumably of Exeter] and about London, braving our severe winters when trained to a wall." From the latitude and altitude of the home of this species, one would expect it to be much hardier than E. polyanthemos, which is rarely injured in the open ground at Kew. We may here mention a few other Tasmanian species likely to prove hardy in the south-west of England and Ireland:—E. Risdoni, the Drooping Gum of the colonists, described as a handsome tree; E. urnigera, a tree with spreading branches, sometimes attaining 50 ft., not uncommon in Alpine districts; E. vernicosa, a dwarf bushy shrub with very small leaves, found at the summits of Mount Fatigue and Mount Lapeyrouse; and E. Gunni, a small tree, abundant in Alpine districts at an elevation of 3000 ft. to 4000 ft., often forming small forests; it is the "Cider Tree" of the colonists. Seeds of other species, also found on the mainland of Australia, should be procured if possible from Tasmania, because they are likelier to prove hardier from thence. Such are E. coriacea, E. amygdalina, E. globulus, and E. viminalis.—*Gardeners Chronicle.*

FRUIT GARDENS AND FRUITS OF TURKESTAN.—"Gardens," says Mr. Schuyler in his book on Turkestan, "constitute the beauty of all this land. The long rows of Poplar and Elm trees, the Vineyards, the dark foliage of the Pomegranate over the walls, transport one at once to the plains of Lombardy or of Southern France. In the early spring the outskirts of the city, and indeed the whole valley, are one mass of white and pink with the bloom of Almond and Peach, of Cherry and Apple, of Apricot and Plum, which perfume the air for miles around. These gardens are the favourite dwelling places in summer, and well they may be. Nowhere are fruits more abundant, and of some varieties it can be said that nowhere are they better. The Apricots and Nectarines, I think, it would be impossible to surpass anywhere. These ripen in June, and from that time until winter fruit and Melons are never lacking. Peaches, though smaller in size, are better in flavour than the best in England, but they are far surpassed by those of Delaware. The big Plums of Bokhara are celebrated through the whole of Asia. The Cherries are mostly small and sour. The best Apples come either from Khiva or from Susak, to the north of Turkestan; but the small white Pears of Tashkend are excellent in their way. The Quince, as with us, is cultivated only for jams and marmalades, or for flavouring soup. Besides Water Melons, there are in common cultivation ten varieties of early Melons and six varieties which ripen later, any of which would be a good addition to our gardens. In that hot climate they are considered particularly wholesome, and form one of the principal articles of food in summer.

BARBADOS.—The island is like a garden; every scrap of cultivable land is turned to account, and in many cases the bare rock has been covered with a layer of artificial soil, thin, but sufficient for the canes, except in excessive drought. It is extraordinary to look at the country and see the industry which has been employed in utilising every inch of it. Everywhere fields of thick waving canes, unfenced and undivided except by the white coral roads, thickly sprinkled with the shanties of the negroes, the white houses of the planters, the low buildings and tall chimneys of the manufactories, and the inevitable windmills; while here and there, but far too rarely, stand a few palm trees, their plumes bent over by the trade wind, and a dead branch or two hanging sorrowfully down the trunk like the helpless wing of a stricken pheasant. Everywhere sugar, sugar, sugar—before which all must fall. The trees were ruthlessly sacrificed to the saccharine Moloch till a diminished rainfall warned the planters that treelessness means rainlessness, and led them to place under the protection of the law such trees as were left. Thus it comes to pass that a drive over the country is most disagreeable owing to the absence of shade. There is no escape from the fierce sun overhead, or the frightful glare of the road beneath; the latter certainly the worse of the two evils, and often serious in its effects on the eyes both of blacks and whites. The only relief is a shower of rain, which is hardly a change for the better, as tropical rain is hard to keep out, and if the sun come after it the consequent damp heat is almost worse than anything. This high state of cultivation involves cheap labour, and Barbados, within an area of 166 square miles, contains a population of nearly 180,000. Of these less than 9½ per cent are pure Whites. It is to this enormous population that Barbados owes its long-continued prosperity, and enabled it to stand successfully the abolition of slavery and of the protective duties on sugar.—*Macmillan's Magazine.*

Original Articles.

THE ROSE.

ROSE SYNONYMS.

In the preceding chapters frequent allusion has been made to varieties of Roses possessing one or more synonyms, or which so closely resemble each other as to render it almost impossible to distinguish them. A brief list of the most prominent of these, compiled by some of our leading authorities on the subject, will probably prove interesting.

M. Schwartz, of Lyons, contributes the following list of Roses and their synonyms to the *Journal des Roses*:—

	Tea-scented.	
Alba rosea	same as	Madame Bravy
Adèle Pradel	,,	Madame Morin
Boiron	,,	Guillot
Clothilde	,,	Bougere
Duchesse de Brabant	,,	Comtesse de Labarthe
Gloire de Bordeaux	,,	Belle de Bordeaux
L'Enfant Trouvé	,,	Elisa Sauvage
Lady Warrender	,,	Clara Sylvain
Madame Denis	,,	Madame Morin
Madame Plantier	,,	Albion
Madame Roussel	,,	Engénie Jovain
Madame Sertot	,,	Madame Bravy
Madame William	,,	Elisa Sauvage
Mathilde	,,	Niphetos
President	,,	Adam
Queen Victoria	,,	Souvenir d'un Ami
Smith's Yellow	,,	Smithy
Surabondant	,,	Guillot
Triomphe de Orléans	,,	Fafait
	Bengal.	
Agrippina	same as	Cramoisie Supérieure
Comble de la Gloire	,,	Gros Charles

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Marguerite Lartay (Bourbon)	same as	Impératrice Eugénie
Madame Lacharme (Tea-scented)	„	Virginale

Noisettes.

Adélaïde Pavie	same as	Madame des Longchamps
Beauty of Glazenwood	„	Fortune's Yellow
Cloth of Gold	„	Chromatella
Comtesse de Beaumetz	„	Chromatella
Enfant de Lyon	„	Narcisse
Liésis	„	Céline Forestier
Madame de Challonge	„	Le Pactole
Maréchal (Tea-scented)	„	Lamarque

Bourbon.

Alice Fontaine	same as	Emotion
Beauté de Versailles	„	Georges Cuvier
Céline Gonod	„	Modèle de Perfection
Duc d'Estrées	„	Henri Lecoq
Eugénie Bréon	„	Virginie Bréon
Gloire de Brotteau	„	Edouard Desfosses
Isabelle Latour	„	Duc de Richmond
Madame Neumann	„	Hermosa.
Madame de Stella	„	Louise Odier
Margat Jeune	„	Charles Souchet
Mélanie Lamarie	„	Hermosa
Michel Bonnet	„	Catherine Guillot
Sappho (Tea-scented)	„	Mrs. Bosanquet
Sou. de la Malmaison à fleurs Roses	„	Leveson Gower

Portland.

Rose du Roi à fleur blanches	same as	Céline Dubos
Rose du Roi à fleurs pourpres	„	Mogador

Rosa Rugosa.

Himalayensis	same as	rugosa rubra fl.-pl.
Regeliana	„	rugosa rubra fl.-simplex
Taicoun	„	rugosa rubra fl.-simplex

Centifolia.

Madame d'Hébray	same as	Unique Panachée

Hybrid Perpetuals.

Alexander Dickson	same as	Madame Pulliat
Avocat Duvivier	„	Maréchal Vaillant
Beauté Française	„	Le Lion des Combats
Belle Egarée	„	Madame Damet
Duc d'Elchigen	„	Poupre Royal
Enfant d'Ajaccio	„	Souv. d'Anselme
François Fontaine	„	Senateur Favre
Froissard	„	Mrs. Standish
Futur Empereur des Français	„	Prince Albert
Général Hudelet	„	Comte de Paris
Général Lamoricière	„	Gervais Rouillard
Gloire de Châtillon	„	Madame Masson
Isoline	„	Paul Dupuy
Julie de Saint-Aignaut	„	Sophie Coquerel
Lælia	„	Louise Peyronny
Mme. Eugénie Cavaignac	„	Baron Heckeren de Vassenaer
Madame Hérivaux	„	Madame Charles Crapelet
Madame Liabaud	„	Virginal
Madame Rival	„	Auguste Mie
Mdlle. Henriette	„	Aubernon
Marguerite Brassac	„	Charles Lefebvre
Marquis d'Ailsa	„	Dr. Marx
Miss Hassard	„	Madame Renard
Mrs. Wood	„	Clementine Seringe
Pauline Plantier	„	Clementine Seringe
Puebla	„	Senateur Favre
Reine du Midi	„	La Reine
Rose la Reine à fleurs blanches	„	Queen Victoria
Souv. du Petit Roi de Rome	„	Conseiller Jourdeuil
Triomphe de la Terre des Roses	„	Henderson
Triomphe de Valenciennes	„	Madame Campbell d'Islay

An interesting paper on this subject appeared in the Rosarians' Year Book from the pen of Mr. George Paul. His extensive culture and his experience as a successful exhibitor gave him great advantages in dealing with it or indeed any subject connected with Rose culture, still, as he himself urges in the paper, he is but one; and strongly appeals to the National Rose Society to take up the matter, and by pronouncing authoritatively on it set the matter at rest. The following is the list of synonyms given by Mr. Paul:—

Hybrid Perpetuals.

1, Maurice Bernardin, Exposition de Brie, and Ferdinand de Lesseps.
2, Charles Lefebvre and Marguerite Brassac.
3, Mdlle. Eugénie Verdier and Marie Finger.
4, Reine du Midi and Madame Alice Dureau.
5, Madame Boutin and Christine Nillson.
6, Maréchal Vaillant and Avocat Duvivier.
7, Mons. Boncenne and Baron de Boustettin.
8, Louise Peyronny and Lælia.
9, Mad. Clemence Joigneaux and La Souveraine.
10, Prince Camille de Rohan and La Rosière.
11, François Fontaine and Senateur Favre.

Teas.

12, Adam and President.
13, Alba Rosea and Mad Bravy.
14, Belle de Bordeaux and Gloire de Bordeaux.
15, Elise Sauvage and L'Enfant Trouvé.
16, Madame Denis and Madame Maurin.
17, Niphetos and Mathilde.
18, Fortune's Yellow and Beauty of Glazenwood.

Following the publication of this list an attempt was made through the medum of the *Journal of Horticulture* to obtain the collective opinion of all the most prominent Amateurs and Nurserymen on the subject, and with the following results:—

GENERAL RETURNS.—*Hybrid Perpetuals.*

1, Mrs. Baker and Villaret de Joyeuse.
2, Baronne de Maynard and Boule de Neige.
3, Madame Hunnebelle and Mrs. Veitch.
4, Mrs. Bellenden Kerr and Mdlle. Bonnaire.
5, Lord Beaconsfield (Bennett) and Leopold Premier.
6, Duchesse de Caylus and Penelope Mayo.
7, Princess Christian and Virgil.
8, Dupuy Jamain and Auguste Rigotard.
9, Antoine Ducher, Marie Louise Pernet, and Mad. Ed. Pynaert.
10, Senateur Vaisse and Avocat Duvivier.
11, La Reine and Alice Dureau.
12, President Thiers and Souvenir d'Adolphe Thiers.
13, Sultan of Zanzibar and Duke of Edinburgh.
14, Madame C. Crapelet and Beauty of Waltham.
15, Jules Margottin and Madame Louise Levêque
16, Comte de Nanteuil and Marquise de Ligneres.
17, Camille de Rohan and Edouard Dufour.
18, Pierre Notting and Velours Pourpré.
19, Madame C. Crapelet and Madame Hugard.
20, Prince Arthur and Triomphe de Caen.
21, Reynolds Hole and Sultan of Zanzibar.
22, Marguerite de St. Amand and Duchess of Edinburgh (Bennett)
23, Marie Baumann and Alfred Colomb.
24, Fisher Holmes and Duke of Wellington.
25, Comtesse d'Oxford and Hippolyte Jamain.
26, Black Prince and Pierre Notting.
27, Princess Mary of Cambridge and Marguerite de St. Amand.
28, Fisher Holmes and Duke of Wellington.

Teas.

1, Perle de Lyon and Perle des Jardins.
2, Bougère and Clothilde.
3, Devoniensis and Climbing Devoniensis.
4, Madame Trifle, Gloire de Dijon, and Madame Levet.
5, Alba Rosea, Madame Sertot, and Josephine Malton.
6, Niphetos and Mathilde.

It would thus appear that there are in the opinion of some Rose-growers, besides the eighteen given by Mr. Paul, twenty-eight cases of duplicates amongst Hybrid Perpetuals, and five cases of Tea Roses.

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It is instructive to note how little these three lists are in accord; in only two or three instances are they unanimous. Nor is this surprising when we consider how vastly Roses vary in appearance according to the soil and treatment they receive, for instance, in Lower Bengal Antoine Mouton and Paul Neron are thoroughly distinct in every point, but grown in the richer soil of the North-West Provinces, they can scarcely be distinguished from each other.

Roses in Towns.

Cultivators of Roses in large towns have difficulties to contend with, of which those residents in rural districts know little or nothing. It is to the growers in such towns, and under such adverse circumstances, that we now tender a little advice. The first and most important thing is to make a selection of such varieties as resist to a great extent smoke and impure air, and these will be found to be kinds having hardy constitutions and glossy foliage such as the following :—

Paul Neron	Climbing Devoniensis
Dupuy Jamain	Belle Lyonnaise
Cheshunt Hybrid	Dr. Audry
Gloire de Dijon	Alfred Colomb
Auguste Rigotard	Baronne Maynard
John Hopper	Boule de Niege
Madame Victor Verdier	La France
——— Berard	Charles Lefebvre
——— Clemence Joigneaux	Countess of Roseberry
——— Hippolyte Jamain	——— of Oxford
Mdlle. Marie Finger	John Stuart Mill
—— Annie Wood	Marquis de Castellane
Etienne Levet	Victor Verdier
Jules Margottin	Senateur Vaisse
François Michelon	Star of Waltham
Reynolds Hole	General Jacqueminot
Duke of Edinburgh	Celine Forestier.

Many more names may of course be added to this list, but those given will be sufficient to indicate the class of Roses most likely to succeed under the circumstances named. With such good town Roses as these to choose from why select delicate growers, which require all the care and attention which a more open country affords, to be satisfactory, and which if planted in towns only too frequently lead to disappointment? Amongst those which will not thrive in towns are Horace Vernet, Madame Furtado, Hippolyte Flandrin, Mdlle. Eugénie Verdier, Duc de Rohan, Thorin, Lord Macaulay, Madame Nomen, Xavier Olibo, Monsieur E. Y. Teas and Marie Baumann. From this it will be seen that some fine acquisitions in the way of Roses are unfit for town growers; indeed, Roses with rough leaves and delicate constitutions cannot thrive in the atmosphere of our large towns. Thick non-porous leaves are not easily injured by smoke and dust, which they throw off more readily when washed by rain than those just named. We should however in all cases recommend syringing or sponging frequently during the growing season, for we need scarcely say that plants cannot thrive when covered with dust and dirt.

SEASONABLE NOTES.

Orchids.

At this season of the year particular attention should be paid to unhealthy plants, should there happen to be any, with a view to their re-establishment. Re-potting, re-basketing or re-blocking a plant in bad health is one of the first things to be considered, and in doing this care should be taken that the plant is placed in as small a plant as possible, and that it is supplied with suitable material. Some mix sand with the material used for potting Orchids, particularly for unhealthy specimens; but although by retaining the moisture round the plants it may appear to be beneficial for a time, experience tells us that it is injurious to Epiphytal Orchids. If the plants root in such material the sand becomes imbedded in the tender gelatinous points of the roots, thereby stunting and distorting them; it also, by keeping the material close, excludes air, which is of almost as much importance to the roots as to the leaves. Although most Epiphytal Orchids undoubtedly succeed better and require less trouble when grown in baskets or on blocks, either suspended or placed on stages, than when grown in pots, and although some are known to succeed best in moss and some in peat, the potting or basketing material to be used must be regarded as matters of secondary importance. The preservation of a proper and genial atmosphere, the admission of plenty of light, and the exclusion of the burning rays of the sun, the maintenance of the requisite amount of humidity, the strict observance of the growing and resting seasons, and, above all, pure air, are matters of the first importance in Orchid culture, and to these the special attention of the cultivator should be directed, otherwise the care bestowed on basketing, potting or blocking will be comparatively valueless.

Shading.—In this matter also it is very important that discretion should be used. The ordinary practice of having a fixed shading not only on the roof but also on all sides of a house cannot be too strongly condemned. The roof perhaps is not of so much importance, and it is generally sufficient if care is taken to regulate the thickness of the shading material according to the season, for instance, from March to June we can scarcely shade too much, but immediately the rainy season sets in it must be considerably lightened, otherwise the plants make weak spindly growth. After the cessation of the rains, or say during the month of October, when the sun is very powerful, more shading will again be required, but from November to February, that is during the resting period of most species, the shading material may be almost entirely removed. The sides of a house however are very different, and we should always have these under our control, therefore for this purpose only moveable shading should be employed. Common bamboo chicks or blinds answer the purpose admirably, and are very durable if they are first given two or three coats of common green paint before being used. The position of the house also has quite as much to do with the time in bright weather when the blinds should be drawn down in the morning or raised in the afternoon as the species of plants grown. For instance, the plants on the eastern side of a house running north and south will, early in the day, be more fully exposed to sunlight than those on the opposite side, which will in their turn get the sun in the afternoon; while in the case of a house facing the south, the latter will be much more under the sun's influence when at its greatest power during the middle of the day. Houses under the full influence of the mid-day sun generally require a little thicker shading materials, but the blinds need not be down nearly so long during the day.

Ferns.

The general potting of these should have been done last month, but if the operation has been delayed until now, it ought to be at once accomplished. If the plants have begun to grow they will be more liable to, suffer from shifting than they otherwise would be; but with careful attention in the way of shading, maintaining an equable temperature, and supplying a moderate amount of moisture both to top and root, little danger need be apprehended. Ferns whose fronds spring directly from the soil require a richer compost than such sorts as the Davallias, whose rhizomes grow above ground. To the former give a mixture of equal parts of good fibrous loam and leaf mould, plenty of silver sand and some small chips of charcoal. If the plants be required however for furnishing purposes, a little more loam and less leaf mould will induce a hardier growth, and one better adapted for house work than the luxuriant growth promoted by the first-named soil. Those with rhizomes above the soil may be potted in the poorer material, pegging the rhizomes down to the soil. Some of the Davallias, Polypodiums and others grow well on old stumps or blocks, affixing themselves thereto like orchids. Syringing Ferns is an operation that requires skill and care, for although some genera are partial to such treatment, others are very averse to it In watering, let the water fall lightly upon the fronds, but in addition to these slight sprinklings, water must also be given at the root more especially during the growing season. Hanging baskets should now be replenished with Ferns and Selaginellas, and Wardian cases should be examined and re-filled if necessary.

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FOLIAGE PLANTS.

CROTONS.—Where proper appliances are available, no more suitable time could be chosen for cutting back and striking Crotons than the present. When the cuttings are taken off, insert them as quickly as possible, removing no more leaves than is actually necessary. Clean river sand, from which all saline matter has been carefully washed, is the best medium in which to strike them. Where a small number of cuttings only are required, the best plan is to strike them singly in 3-inch pots; by this means they suffer less check when potted off than if struck in potting pans or boxes.

DRACÆNAS.—Where old plants are available the present is a good time to commence propagating them. The top portion should be first removed by taking off a ring of the bark about half an inch in breadth. Over the incision bind a good layer of moss, and if this is kept constantly moist, roots will be freely produced in about a month. As soon as these protrude through the moss the plant is ready for removal. Cut through the stem immediately below the moss and pot at once in light porous soil, shading carefully till well established, the remainder of the stem and tap roots should be cut into pieces about an inch in length and inserted in sand, each piece will produce three or four young plants ; as soon as they are 3 or 4 inches high these should be potted off into 3-inch pots.

PALMS.

There is probably no class of plants that is so much neglected in our gardens as those belonging to this extensive natural order. In Europe their culture has increased enormously during the last few years, and although almost all of them require artificial treatment entailing heavy expenses in the construction of suitable houses and the maintenance of a high temperature, they now certainly form one of the most useful and popular families in cultivation. In this country they are still looked upon not only with apathetic indifference, but are too frequently studiously avoided; and yet we have a climate and soil in which probably nine-tenths of the six hundred known species could be successfully grown without resorting to artificial aid. The vast difference in the popularity of this genus in the two continents is of course easily accounted for. In Europe, the stately habit of most of the members of this order, combined with their bold, handsome and generally graceful foliage, form a striking contrast to that of all indigenous vegetation, and naturally attract attention. Here, on the contrary, in most districts the eye becomes surfeited with the monotonous nature of our Indian landscapes, wherein the Cocoa-Nut, the Betel Nut, the Date Palm and the Palmyra form such an important factor, and it is probably for this reason that the more beautiful members of this family are not generally popular. One introduced species (*Livistonia Mauritiana*) has certainly become extremely common, being found in almost every garden ; and although it does not possess the graceful habit of many others, still as a decorative plant it must be placed in the first rank, for it will thrive under almost any treatment—smoke, dust, and the numerous concomitants of town life or crowded rooms seeming to have no ill effect on it. For table decoration few, if any, class of plants are so useful and effective as many of the Palms when in a young state, being entirely devoid of anything that approaches to what may be characterised as lumpy or ungainly, and possessing almost every feature that is calculated to please the eye. When viewed either as isolated subjects or mingling their graceful fronds with other plants or works of art, they occupy the very front place among foliage plants for decorative purposes. They are, moreover, easy of cultivation, and can be reared to very suitable sizes for table work in small pots, and the texture of their foliage enables them to stand wear and tear better than most other plants. In the case of any plants that are getting too large for table work, they should be given a liberal shift, paying particular attention to the drainage, which should be carefully and well done. If they are put into 10 or 12-inch pots, large plants will be the reward. Scarcely any plants get so large in the same sized pot, and look healthy for a long time, as Palms do when in small pots, and it is wanted to keep them so. If very much pot bound, reduce the balls considerably, put them in clean pots with good drainage, making the compost fairly rich, and ramming it quite firm to get in as much soil as possible in the pots. As the pots will be small in proportion to the size of plants, after potting them stand the plants in a cool shady position, not over watering them for some time until they have commenced to root freely.

We will now proceed to give a list of the most popular varieties.

ARECA.

Areca alba.—A very handsome species, leaves four to six feet in length, pinnate, the petioles densely covered with a white tomentum, pinnæ 1½ to 2 feet long and two inches wide, of a clear bright green, thornless.

Areca Alicæ.—This name has been given by Dr. Mueller, to a new North-east Australian Palm found in Trinity Bay by Mr. Walter Hill, and commemorates the late Grand Duchess of Hesse—Princess Alice. It is of dwarfish habit, bearing pinnatisect leaves, the pinnæ-like segments being sessile. Its comparatively dwarf habit will render this pinnate Palm a valuable one for decorative purposes.

Areca aurea.—A very fine variety with long drooping pinnæ of a very dark green, easily recognised by the deep orange yellow of the petiole.

Areca Baueri.—This is a very handsome species. Native of Norfolk Island, where it forms a very striking object in the scenery, and in a young state it is very effective and easily grown. The leaves of the young plants are indistinctly pinnate, beautifully arched, of a deep green colour. The seed of this species readily germinates, and the plants will succeed in a comparatively low temperature.

A. crinita.—A much-esteemed species. Native of the Mascaren Islands. The leaves are distinctly pinnate with numerous pinnæ, finely arched, with large sheathing petioles which are thickly set with sharp black spines. This is a very distinct and desirable Palm.

Areca Catechu.—Too well known in Bengal to need a description, it being the species that produce the Betel Nut.

Areca Herbstii is a very handsome plant ; the leaves, which are of a pale glaucous green, are beautifully recurved, and the leaf-stalks are covered with long sharp spines.

Areca lutescens.—This is a very graceful Palm, the pale yellow leaf-stalks giving it a very light appearance ; plants that have been hardened off will stand well, but it is best to avoid using them while they are developing young leaves.

Areca monostachya.—The Walking-stick Palm. It grows to a height of six or eight feet ; the stem is about 2 inches thick, and is crowned with a head of graceful leaves, which are sheathing at the base and divided into irregular variable segments : a most useful Palm for table decoration.

A. Verschaffelti.—Young as well as old plants of this species are extremely handsome, and if convenient it is well worth growing as long as possible. When the plants are 4 or 5 feet high they are most effective. The bright orange midrib is a very distinctive mark. The leaves are pinnate with numerous pinnæ, very narrow and gracefully curved, as well as the entire leaves. It is a native of the Mauritius.

A. Wallichiana.—Although a native of this country, we are not aware if it has yet been cultivated here. A very distinct and desirable species of very dwarf habit ; the leaves are pinnate, arching gracefully, of a very dark green hue ; the leaf blades are clothed with orange and black scales which give it a very striking appearance.

ARENGA.

Arenga saccharifera.—This, as the name implies, is one of the sugar-bearing Palms. The medulla of the trunk is also used as sago ; a very ornamental species, but can rarely be induced to grow satisfactorily.

Arenga Wightii.—A fine Indian stove Palm from the region of Coimbatore. It has a dwarf stem, and pinnate leaves with alter-

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nate linear pinnæ, and smooth petioles. In the young plants the leaves are at first simple, cuneate and erose around the upper edges; as the plant develops they split up into pinnæ, the next stage being that with a cuneate central lobe, and a pair of narrower lateral pinnæ, in which the apex is obliquely cut away on the lower side.

ASTROCARYUM.

Astrocaryum Argenteum.—A fine silver-leaved Palm, from the United States of Colombia. The stalks and the under surface of the leaves are covered with a fine white scurf, which gives them a silvered appearance. The leaves are arching, wedge-shaped and bilobed, distinctly plicate, and of a bright green colour on the upper surface, which contrasts strongly with the whitened under surface. One of the best of the so-called Silver Palms.

A. Granatense—A distinct Palm from the United States of Colom- It has brownish-looking leaf-stalks, which latter are armed with numerous scattered needle-shaped dark-coloured spines. The leaves themselves are pinnately parted, with oblong acuminate segments, and the rachis is spiny, like the petiole, both on the upper and lower surface.

BRAHEA FILAMENTOSA. *See* PRITCHARDIA FILIFERA.

CALAMUS.

Calamus ciliaris.—This is quite a gem amongst small-growing Palms. The stem is erect and slender, leaves pinnate, clothed with a quantity of soft hairs The bright light green colours of the leaves, together with their feathery-like appearance, renders it a useful and graceful subject for dinner-table decoration.

Calamus subangulatus.—An interesting Palm. In the young state it has green prickly stems, the spines being arranged in three longitudinal lines on the leaf stalks. the leaves at this stage of development are bifid.

CARYOTA.

Cariota Cumingii.—A native of the Philippine Islands, and the only dwarf member of the genus, rarely attaining a height of more than 10 or 12 feet; the leaves are four to six feet in length and about three feet in breadth.

Caryota sololifera.—A very handsome variety with bi-pinnate foliage; the young petioles are clothed with a short black scaly tomentum, which fall off as they attain maturity.

Caryota urens.—This is the best known member of the genus, and in this country is generally described as the Sago Palm, although that title is given to two or three other members of the Palm tribe. It is also known as the Wine Palm in some countries, its juice is used in the same way as that of the Palmyra and the Date tree.

CALYPTRONOMA SWARTZII.

A very pretty little pinnate-leaved Palm, useful for decorative purposes; the young leaves are of a pretty reddish-brown, similar to those of *Welfia regia.*

CHAMÆDORBA.

This is a very handsome genus, comprising chiefly small slender growing plants admirably adapted for decorative purposes; they are natives principally of South America, and but few of them have yet been introduced into this country.

Chamædorea eburnea.—A very beautiful species of rather recent introduction, coming from the New World. In a young state the leaves are deeply three-lobed at the apices, becoming eventually pinnate and gracefully arched, of a vivid green colour, while the long slender petioles are white—a point which greatly enhances its beauty.

C. elegantissima.—This is excellent as a table plant; the leaves are finely pinnate, well arched, and of a deep glaucous green colour.

COCOS.

Cocos Weddelliana.—This, without doubt, is the most elegant Palm ever introduced to our gardens from tropical South America. All the species of Cocos are more or less graceful, but this far surpasses the others. The stems are very slender in old as well as young plants, and covered with darkish fibre: the petioles are long and slender, beautifully arched with the very numerous pinnæ, narrow deep green above, white beneath. As a table plant the value of this plant cannot be over-estimated, while nothing can excel it for the embellishment of the house and the arrangement of the exhibition table. The entire plant presents a gracefulness which should find its way into all collections of plants of any pretensions whatever.

LONDON OFFICE

OF

THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

1, Whitefriars Street, London, E. C.

Correspondence.

THE EDITOR "INDIAN GARDENER."

DEAR SIR,—I shall feel obliged if you or any of your subscribers would be so good as to advise me on the following subject:—

I am making sowings of the Country Radish Seed—the Moolee. The seed germinates freely, but as soon as the plants show above ground they are attacked by some small insect which eats away the leaves. Can you tell me what I should do to prevent this? I have tried the old method of sprinkling the plants over with ashes, but without success.

Yours truly,

AMATEUR GARDENER.

Jubbalpoore, 21st April 1886.

NOTE.—Without knowing the kind of insect—whether grub, beetle, or fly—it is almost impossible to prescribe a remedy. We presume, however, it is a variety of the Turnip Fly (Haltica memorum). The best remedy for this is to dust the seeds with flowers of sulphur before sowing, or water the plants occasionally with lime water, using good fresh lime at the rate of four ounces to the gallon of water.—ED., *I. G.*

THE EDITOR "INDIAN GARDENER."

SIR,—In our Bombay Gardens the Annuals are just over, a few Phloxes, Verbenas, Fox-gloves and Petunias yielding a final glow of colour before they fade away. Nature is, however, kind to us here, and Lilies of all colours are bursting out in bloom under the influence of an April sun.

Will you please inform us whether they should be shifted when the roots become pot-bound, or do they object to change and fresh soil.

We were glad to read your remarks about Calladiums, as they are coming up on all sides.

Is this the right time for budding Roses? and in Bombay should we winter them in May and June just before the monsoon? We require them to flower in January and February.

In reading your description of new Stove Plants, &c., in your last number, it seemed a pity there were no engravings of these new varieties. Perhaps, as the journal becomes more popular, you may see your way to giving us an occasional engraving or Illustration of various plants.

Your faithfully,

B. & S.

Bombay, April 20th, 1886.

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NOTE.—I. Lilies. We presume our correspondent, like many others class Amaryllis or Hippeastrums under the general term of "Lilies," and that it is to these he refers, although, in fact, they are not Lilies at all. If our supposition is correct, we should advise him to leave them as they are at present—but to encourage free growth give them frequent applications of liquid manure. In January or February next, that is after their season of rest, and just before starting into growth again, they should be repotted—planting one, two, or three in a pot, according to size.

II. Roses.—These should have been budded in February, or early in March, you must now wait till about the middle of July, when this operation may be succesfully carried on.

III. Wintering Roses.—The object in artificially hibernating Roses, is to secure thoroughly ripened wood to ensure the plants blooming freely. If B. and S. were to winter his Roses in May and June, what would become of all the succulent growth made during the monsoon? Our experience tells us that the more we encourage a vigorous growth before the rains set in, the better it is for the plants. Let him then wait till October to winter his Roses, exposing the roots as much as possible, after which manure liberally, and prune with discretion, and in January and February he will have a display of bloom that will gratify him.

IV. Illustrations. We hope to be able to make arrangements, so that from the commencement of Vol III in August next this journal will be regularly illustrated.—ED., I. G.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be repelled to should be sent in not latter than the Friday previous to the day of publication. All communications should be written in one side of the paper only. It is also requested that correspondents forward their name and address not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts,

THE NECESSITY AND RIGHT USE OF MANURES.

While soils remain covered by unbroken forests or prairies, they not only retain their fertility but actually grow richer from year to year. The vast amount of nutritive matter annually absorbed is ultimately returned with interest. In the forest the leaves and broken twigs, and eventually the branches, trunks and roots, give back not only what they have received, but much in addition which they have drawn from the atmosphere. On the prairies the luxuriant growth dies down each year, and adds very largely to the original matter which it abstracted by its rapid growth.

The productive power of soils subjected to cultivation is gradually exhausted by that process. Some of the alluvial lands of Virginia produced large crops of corn and tobacco for more than a century, without any return being made to them for the elements of fertility thus abstracted, and these lands thus cultivated are now so poor as to be nearly valueless, but if the plan of rotation of crops, manuring, or resting the land in grass, had been pursued, what different results would have been attained, and how very much richer the whole State would be now, and unless the farmers of the Great West and other newer portions of our country profit by the experience of the farmers in the Eastern States, their land will become exhausted in the same way; and there is no doubt that the realization of this fact is to some extent causing the tide of immigration to turn its attention to the lands of the Southern States, or States that are nearer our great market centres than the rich prairie lands of the far West, as all good farmers know that by a proper system of farming, land that has produced good paying crops, can be made to do so again. In the State of New York statistical tables prove that the yield per acre of the cultivated land has decreased considerably since 1884, when the records on which these tables are founded were commenced. In corn the decrease is nearly four bushels per acre, and in potatoes twenty-two and a half bushels. The falling-off would have been much greater had not deeper tillage, and a better system, and knowledge of agriculture furnished a partial offset to the decreased fertility of the soil.

The fruitfulness of a soil is decreased or increased according to inexorable laws. With each crop that is taken from the ground a greater or less amount of fertility is removed, and if this process is continued year after year ultimate barrenness must result. There is no remedy but that of supplying, in the form of manures, what is thus taken away. The farmer must feed the land which feeds him, and so many others, or in the end, all must starve together. I will now endeavor to give a short description of the different manures, and in order to do so, have arranged them in three classes: vegetable, animal and mineral.

Vegetable manures are not so energetic in their action as those of animal or mineral origin, but they are much cheaper and more durable in their effects, and the wise farmer will avail himself largely of the means of benefiting his soil which they afford. Plowing in green crops, such as clover, cow-peas, buckwheat or corn, is one of the best modes of renovating and sustaining a soil. Wornout lands which are almost unsaleable, can by this means be brought up to a high state of fertility and at the same time be made to remunerate the farmer for the outlay of labour and money by the crops that can be produced in the meanwhile. North of the Carolinas, clover is as a rule found to be best fitted for a green manure, but in some cases there are other special crops that can be used to a greater advantage, as for instance on all light lands, the cow-pea will produce a much heavier crop, and act much more beneficially than clover will, while on heavy lands clover is by far the best. At the South the cow-pea or bean is considered the best fertilizer. The advantages of green manures consist mainly in the addition of organic matter which they make to the soil. This matter aids in the liberation of those mineral ingredients which are there locked up, and which on being set free act with so much advantage to the crop. The roots also exert a great power in effecting this decomposition, and their agency is far more efficacious than the intensest heat or the strongest acid in persuading the elements to give up for their own use what is essential to their maturity and perfection. By substituting a crop for a naked fallow we have all the fibres of the roots throughout the field aiding the decomposition which is slowly going forward in every soil. Clover and most broad-leaved plants draw largely for their sustenance from the air, especially when aided by the application of plaster. By its long tap-roots, clover also draws from the subsoil in solution such saline and mineral matter as are necessary for the maturity of the plant, which when utilized in the surface soil adds much to its fertility. The proper time to turn in all crops used as a green manure is at the season of blossoming, as in the green state the fermentation is rapid, and by resolving the matter of plants into their elements, it fits the ground at once for a succeeding crop. Straw, leaves and vegetable are readily decomposed by the addition of a small quantity of animal substance, or lime, and should be carefully composted, as they will add very much to the quantity of nutritive matter collected under the form of manure in a year. Turf, muck, mud, the cleanings of old ditches, etc., are very rich in vegetable matter, and are exceedingly valuable to the farmer for use in composts, and should be much more used and appreciated than they are now.

Animal manures comprise the flesh, bones, blood, excrements, etc., of animals. They contain more nitrogen than vegetable manures, and are far more powerful. The standard manure of this country is stable manure, which is composed of the excrements of the domestic animals. Of these that of the horse is the most valuable in its fresh state, but is very liable by fermentation to lose much of its value. A good sprinkling of salt occasionally will prevent this loss and add very much to its manurial value. The manure of sheep is next on the list, while that of the cow is of the least value, as the enriching substance of her food goes principally to the formation of the milk. The value of each of these manures varies with the food and condition of the animals from which it is obtained; the manure from well kept cattle being far more valuable than that from those which are poorly attended to. All the urine of animals should be preserved when possible, as it is very rich in nitrogen and the phosphates, and some writers on agriculture maintain that its value if properly preserved and applied is greater than that of the dung. From an experiment made a short while ago, it appears that in five months each cow discharges urine which when absorbed by loam furnishes manure enough of the richest quality and most durable effects for half an acre of ground; or to put it in other terms, the urine of three cows for one year is worth more than a ton of fertilizer, costing from forty to fifty dollars, and there are various methods by which this manure might all be saved if the intelligent farmer

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will only set his wits to work in a proper manner. One simple way which I have observed, is to obtain a supply of soil in dry weather and to store it away in some shed or outhouse, and use it as an absorbent under the bedding, removing the soil to the compost heap as often as it becomes necessary. But the waste of manures is not confined to those of the liquid form : stable manure is often left exposed to the action of the weather and to ferment until the greater portion of its most valuable elements have disappeared, and as it is always desired to retain these fertilizing elements, it should be sheltered from the sun and rain, and fermenting heaps so covered with turf or loam, as to prevent the escape of the fertilizing gases. Plaster will help very much in retaining the ammonia, which is one of the most necessary elements of plant food.

The manure of all poultry should be carefully preserved, as it is extremely rich in nitrogen and the phosphates. Professor Norton says that one hundred pounds of this material that has not been exposed to the rain or sun, is equal in value to five or six loads of stable manure. It must be kept dry, reduced to powder and applied as a top dressing, or else formed into a compost with some matter to act as an absorbent.

The flesh of dead animals, and the blood and offal from slaughter-houses are among the most powerful of fertilizers ; and yet it is not uncommon to see horses or cattle that die from disease drawn out in the woods or fields to decay on the surface of the ground. Every animal that dies should be made into a compost at once by covering with a few inches of turf or loam, as by that means decomposition goes on without the loss of the fertilizing elements, and a manure of the most valuable kind is produced.

The value of bones as a manure is undisputed, and they are beginning to be appreciated as they deserve to be by our farmers. They contain some of the most desirable and efficacious of the fertilizing elements required by plant life, and no thoughtful farmer should suffer them to be wasted about his house. One simple way of making bones available as a fertilizer is to take sulphuric acid and dilute it with three times its bulk in water ; then place the bones in a tub or barrel and pour in the acid as diluted upon them. After standing a day another portion of the acid may be poured on, when they will be found to be dissolved into a kind of paste, which is best applied by mixing thoroughly with earth, ashes, dried muck or some such matter.

Mineral manures include lime, marl, plaster, salt, ashes, etc. These are very useful in supplying any inorganic matter that may be required to improve the fertility of the soil, and are also very valuable to improve the conditions a soil may be in.

Lime is applied to land in three different states—as quick lime, slaked lime, and mild or air-slaked lime. To cold, stiff or newly-drained land it is best to apply quick or slake lime, while on light soils, mild or air—slaked lime is most beneficial. It is best to apply lime frequently and in small quantities, so as to keep it near the surface and always active.

Marls are chiefly valuable as a fertilizer on account of the amount of potash and carbonate of lime which they contain, and act very beneficially on light sandy soils.

Plaster is one of the most powerful mineral fertilizers known, acting both as a direct food of plants, and also absorbing gases and making them available to plant food. When scattered over compost heaps it will absorb the ammonia, and prevent the escape of it and other fertilizing gases. It is very beneficial when applied as a top-dressing to grass and clover lands, but should always be applied in wet weather or while the dew is on. It can also be used with decided advantage on potatoes, collecting the moisture and preventing them from rotting after they are planted, and in fact can be applied advantageously on almost all crops, and should be used liberally by every intelligent farmer.

Common salt has been in use for ages as a fertilizer, and its great value cannot be disputed. As an ingredient in compost it is invaluable, and operates on the soil with an influence which can be produced by no other stimulant, mineral or vegetable. It is very beneficial as a top dressing for wheat and grass lands, especially those of a loamy texture.

Ashes are composed of the entire inorganic parts of plants, and their great usefulness as a manure is evident and undisputed. The ashes from different trees differs materially in composition and value, but all are highly useful applications to every kind of soils and crops. Coal ashes are less valuable than wood-ashes, but are by no means to be neglected by the farmer, being very useful, especially on stiff soils.

In conclusion, let me say that every farmer can have the means of enriching his farm and himself if he will only obtain a knowledge of the way to make manure, to save manure, and to properly use manure.—HENRY W. WOOD, Richmond, Va.—*Southern Planter.*

MUSHROOM CULTURE.

Numbers of people think that the culture of the Mushroom only begins when the bed is spawned, and practically speaking it does perhaps, but success depends upon circumstances considerably anterior to that. The preservation of the spawn has much to do with it. If kept too cold it may be dead, and if kept too warm and moist, it may have become too far developed for cultural purposes. Well-preserved fertile bricks are permeated with a thin, whitish-looking mould, and smell strongly of Mushrooms. If the spawn be distinctly thready looking it has gone too far, but it need not be discarded on that account, though it is unlikely to produce such good crops. Nurserymen should always be prepared to send their bricks out in a perfectly dry and good condition ; but, whether owing to bad storage or not, they are too often quite moist, containing spawn in an active state. I should not like to subject Mushroom spawn to a lower temperature than 40° for any length of time, but would not venture to assign the limit in the ascending scale so long as the bricks were kept dry. That it may be safely subjected to a temperature of 90° or 100°, and kept for years under such circumstances we can testify from our own experience, and prefer such spawn to new for several reasons ; but principally because it produces Mushrooms sooner and of better quality, and at the same time a more abundant crop. Our constant rule is to use the oldest spawn first, and, as it is stored above a flue close to the furnace, it is always as dry and as hard as it can be. That old spawn so preserved is better than new has long been the opinion of many good Mushroom growers, and it is certain it can be preserved only in a dry state, for if the bricks be moist, a high temperature only causes the spawn to run into the thread-like stage, when it becomes useless.

CHIEF POINTS IN MUSHROOM-HOUSE CULTURE

These are summed up under three heads, viz., preparation of the fermenting material or stable litter ; temperature ; and watering. As regards the first, some cultivators are very particular, and will have nothing but the pure horse-droppings, and the saving of these free from straw and litter is part of the daily work of one man in many gardens. Such work is, however, entirely needless. In fact, a bed composed of horse-manure alone is worse to get into good condition than any other, owing to the violence of the fermentation and the difficulty in getting the material as sweet and dry as it should be. Of all materials for Mushroom bed-making nothing is so convenient, and nothing works off so readily as stable litter long and short taken just as it comes. The droppings alone, if they get wet before they can be procured, require much attention before they are fit for use ; but if mixed with the straw as it comes from the stable there is no difficulty. A few turnings suffice to bring the material into good condition, and the bed is ready for the spawn in a much shorter time. Of course the manure should be prepared under cover, in a cool shed, or some such place, and it should be turned frequently, say, once a week, till the heat is just bearable by the hand, and till it is tolerably chaffy but still moist. A wet bed will never produce a good crop, if it produce anything at all. The manure should be just moist enough to heat, and yet so dry as partly to defy treading or beating with the mallets in making up the beds ; this is the most favourable condition for inducing the quick run of the spawn, and in such a case the sooner the bed is spawned the better, provided the temperature be low enough. I am thus far particular in trying to convey my meaning perfectly on this point, for many fail in preparing their Mushroom beds. Next, as to the temperature of the bed, I may just state the kind of structure used as a Mushroom-house has much to do with this. Cellars or caverns are the best places of all, being little affected by the external temperature ; but any structure will do in which the temperature can be maintained steadily at about 55° ; it may be allowed to go as high as 60° or as low as 50°, but these figures represent the limit. In a high temperature the Mushrooms are long legged and of poor substance, and the bed soon gives over bearing ; while, if the temperature be too low they come on very slowly, and often go

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off as fast as they come. If we could by any means keep our beds at 75° for a month after they were spawned, we should not be anxious about spawning till the beds had subsided to that figure; but as the temperature goes down every day after the final treading till it has reached that of the house or thereabouts, the growth of the Mushroom is materially interfered with, for the spawn will not run readily or well in a lower temperature than 75°. I have tested this point over and over again, and always with the same result, viz., a very slow crop or no crop at all. Endeavour, therefore, to get the spawn dibbled in 4 in. deep at least, as soon as the bottom-heat thermometer records 85°, being sure the temperature is on the decline. Afterwards cover the bed thickly with hay or straw to prevent loss of heat, and in about a fortnight later, as a rule, the spawn will be running freely in the bed, and a crop of Mushrooms is then a certainty, if no accident occur. If the spawn have run well, the time to give water is of some importance; a good drenching judiciously given will sometimes bring the Mushrooms through a week or ten days sooner than they would have come. Not a drop of water should be given for three weeks at least after spawning; but if it be then seen that the bed is pretty well run with spawn of a thready texture, and particularly if on the surface of the bed, here and there in the form of embryo Mushrooms, a good watering may be given with water of the same temperature as the bed, and the dose may be repeated three or four times within a week or ten days. This will bring the crop through in quantity, after which water must be given only when it is required to keep the bed tolerably moist.

Mushrooms without Artificial Spawn.

It is not always necessary to use artificially-prepared spawn in Mushroom culture, as natural spawn is often procurable in great quantities in old stable litter heaps and places where it is germinated spontaneously, so to speak. I have often had chance crops from such a source. On one occasion a lot of loose stable litter, which had been laid of in a heap for a month or two, and which was afterwards dug into the ground for the Broccoli crop, produced in September and October quite an abundant crop. On another occasion a pit which was filled up with nothing but the dry straw from the stable yard—the droppings having been previously shaken out of it—and soiled and cropped with Potatoes, produced one of the most enormous crops of Mushrooms we ever saw. They came in clusters as large as peck measures, and continued to come for three months. This was in the month of May, some few years ago, and the straw had been put into the pit in the month of August previous. Spawn of this kind is usually of the very best description, and it is often to be found in litter produced by well-fed horses, if it have been allowed to lie for a while. Usually it is in the dry flaky portions of litter that it is most abundant. They are white and mouldy, like a Mushroom cake, and smell even more strongly of Mushrooms. These flakes may be gathered and stored in the same way as the bricks. —*The Garden.*

ANOTHER NEGLECTED INDUSTRY.

Dr. E. Bonavia writes to the *Pioneer*:—

In the *Pioneer* of 23rd November, 1885, page 5, I read that in 1881-82, out of total quantity of 993,176 tons of wheat exported from India, Italy took 17,966 tons. In 1882-83, out of 737,220 tons, she took 8,800 tons. In 1883-84, out of 1,047,824 tons, she took 22,270 tons, and in 1884-85, out of 792,714 tons, she took 35,045 tons, so that the exports of Indian wheats to Italy have nearly doubled in four years. There can hardly be a doubt that the Italians have found the hard Indian wheats—rich in gluten—eminently suited to the manufacture of macaroni and other Italian pastes. Just observe now how we in India obtain our macaroni—an article of diet which is much prized by all who have eaten it, but which is now used only like "bonbons," on account of its prohibitive price. The Indian wheats first go to Italy, and some of them, either in Naples or Genoa, are then ground, sifted, and manufactured into macaroni. Then they are shipped as macaroni to England and France, boxed in tins or wrapped in small paper parcels, and sent back to us as tins or packets of macaroni. The result of the Indian wheat's travels to the seaports, its voyage across the seas, its perambulation in Europe passing through three or four hands, and its return journey to India is that we get tinned macaroni—Fabbrica De Barbieri —nervi—expressly prepared for Crosse and Blackwell at *Rs. 2 for a 2lb tin*. That is the price I paid for it the other day in the shops. Other English firms also send us tinned macaroni at equally absurd prices. That which comes from France is made up in long blue paper packets, and bears the label of "Grouit Jne, Pairs—Macaroni gras de Naples." The latter, I think, is the best, but, if I mistake not, also the dearest. Last year I bought a tin of macaroni of another firm, also at an absurd price, and, in boiling the paste turned black. The difference between the superior and inferior kinds of Italian paste is that the more you boil the former the whiter they become, while the latter turn darker the more they are cooked, probably in the same way that brown bread turns dark by baking. No one will probably deny that the Italians, rich and poor, live largely on macaroni; therefore the inference is that this article of diet can be manufactured and retailed at a comparatively *low price*, probably at a few pence per pound, while we are forced to pay for the imported article *one rupee per lb.* The new industry which I now suggest is a macaroni factory, which would work up our macaroni wheats *on the spot where they are grown*, either in Oudh or in the Punjab. The advantages are obvious. The carriage to the sea-ports, the voyage to Europe, the perambulation over Europe, and probably the cost of tin boxes and the return journey to the Indian shops with other expenses would be saved, and for the dear labour of Italy would be substituted the cheap labour of India. In addition the bran—a very nutritious cattle food—would remain in the country. Then we might hope to get our macaroni at about 4 annas or less per pound. At present a dish of macaroni is a luxury that only the rich can afford If this article could be produced cheaply in India, all the European troops might be able to have it two or three times a week, instead of their monotonous and perpetual meat diet, winter and summer. All the Anglo-Indian and Eurasian population and the Christian population of South India would use it, and probably, if Mahomedan workmen were employed in the factories, the whole Mahomedan population of India would also eventually use it in the same way that many of them now use European fashioned bread (*double roti*, as they call it) made by Mahomedan bakers. It will thus be seen that the probable field of consumption is not at all small, if this article could be produced in India at a low price. There might, perhaps, be room for more than one factory.

This is not all, Macaroni and other Italian pastes, if properly dried, will keep a long time, and if sufficiently cheap would, no doubt, soon become an article of war provisions. For immediate use it does not appear that tin cases are necessary for macaroni. That imported from Paris is simply wrapped in thick blue paper. I kept macaroni in these papers all through last rains without their in the least spoiling. No doubt the Indian paper mills would be able to manufacture a cheap thick suitable wrapping paper. With macaroni might be associated the manufacture of "semolina," which is only a superior sort of "soojee"—an article highly nutritious, and suitable not only for making superior bread, but also as an article of war provisions for the thickening of soups and broths, and for making camp bread. Finally, in the same factory might be set up the manufacture of biscuits, which are also now imported at ruinous prices; a good and cheap war biscuit is, I should say, much needed in India for European troops. If a macaroni factory were started in India, where it is presumed the hard wheats are well suited to its manufacture, Australia, the Cape, and all Eastern markets might get their supplies of this article from India. To sum up, the advantages would appear to be cheap macaroni for all Indian and Eastern consumers; cheap and plentiful semolina and biscuits—bran for cattle, sheep, and poultry; a profitable investment for capital; and a new industry for the labour of this country. All that would appear needful are capital, and a couple of Italian macaroni makers as foremen. Either Lucknow, Cawnpore, or Lahore, the centres of the wheat growing districts, would be suitable places for factories. There the hot weather and winter are admirable seasons for drying the paste without artificial heat. Wire-gauze door and window fittings would be required to keep out the flies and to ensure general cleanliness.—*Madras Mail.*

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VASES AND VASE PLANTS.

The uses of vases in connection with terrace gardens becomes almost a necessity, and, in many cases, they form both an interesting and attractive feature when used in moderation, giving quite a finished tone to the terrace, wall or balustrade, which was only needed to make the general appearance of the grounds complete. But too frequently, instead of half-a-dozen really noble-looking vases in which plants would flourish and would have an imposing effect, there are substituted fifty small ones, wherever the ingenuity of the designer could find a plea for placing them, and in which nothing but Aloes or Geraniums can exist. In the cultivation of plants in the open air the least experienced grower will acknowledge the necessity of protecting the roots from the scorching rays of the sun in summer and the action of frost in winter, by plunging (if in pots) and by mulching in open ground. But plants in vases, from their elevated and generally exposed positions, are calculated to feel the full force of both with the greatest severity. In the case of small vases, from the thinness of the stone and the small quantity of soil which they contain, the power of the sun's rays is so severely felt that it is a difficult matter to maintain the vitality of even the least sensitive subjects, as stagnant moisture is even more speedily destructive than drought. These contrivances may be termed plant-destroyers, for, when used on a large scale, nothing but a reserve stock of plants will suffice to keep them presentable. But really good vases are, when well furnished, attractions and valuable additions to any garden. They should, in the first place, be made sufficiently substantial for the sides to form ample protection for the roots of the plants against cold or heat, and should contain soil sufficient to retain moisture for several days when once thoroughly saturated. If these simple requirements be not provided for, together with good drainage, it is almost hopeless to expect a successful result. In the planting of Vases, the best results are generally obtained by individual taste in disposing of the materials at hand, rather than by any strict adherance to orthodox rules. But it is well to bear in mind that it is better to exclude anything from the arrangement altogether, even if a choice plant, unless it is well known to succeed in such a situation. A really healthy vigorous plant of Yucca recurva is far superior in effect to the best coloured Dracæna that is evidently *not* enjoying its position. But there is such a wealth of materials thoroughly adapted to the purpose in both foliage, flowering, and trailing plants, that it will not be for lack of suitable subjects if a successful result be not achieved. When vases are arranged in pairs, it is of course advisable to fill them so that they may not only match, but the effect will be greatly improved by contrast if alternate pairs be filled with such graceful plants as the Yucca recurva and Ivy-leaf Geraniums, and the next pair with erect stiff-looking plants as the variegated American Aloe and Scarlet Geranium, edged with trailers, as upon the thoroughly furnished look of each vase will depend success or failure in the decoration. To clothe the outer edgings effectively, a small wire to which trailing plants can be attached is necessary, for if allowed to be swayed by every wind that blows, they are very liable to receive injury from the sharp edges of the vase.

J. C.

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A Bi-Monthly Journal of Horticulture in all its Branches.

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Editorial Article.

FLORAL DECORATIONS.

TABLE decoration is one of those arts which most effectually test the operator's taste, ingenuity, and expertness in handling flowers,—a sleight of hand which is a good deal the result of experience, but one of those things in which practice can never take the place of natural facility. Some persons with infinite labour will send a whole bushel of flowers, leaves, and materials *hors de combat* with very unsatisfactory results, while another with a handful will produce a graceful effect with no particular effort.

The mode and materials for table decorations are endless, the former depending a great deal on the size of the table, the style and magnitude of the room, and accessories, such as chandeliers, the nature of the plate, and the style of the ornaments to be used for the time. For instance, combinations of groups of plants may have to be used, or a lighter style of arrangement with cut flowers, or both combined. Sometimes a massive style could be most effective, in which vases of fruit might be introduced in company with plants ; in fact, the modes of arrangement which one's ingenuity might suggest are endless, and the decorator who has an eye to business will have little difficulty in introducing fresh character, if he has anything like a stock of materials to work upon. Decoration of any sort is a matter of taste, there is no specific rule for its accomplishment ; it changes like the commoner fashions of the day, though we hope it is not as unstable as contemporary fashion in other branches.

From a gardener's point of view, any style that does not represent nature is not right. Probably we are all rather prone to dogmatise—to follow in the wake of some "guiding light" who indicates the way of his own choice. Natural decoration is a comprehensive study. We have nature represented in many different phases, still it is nature. We imitate it after a fashion, we trim it, as it were, or we do the opposite, in the same way as we train a plant that would look better untrained.

Much has been written on table decoration, and the tendency has been to confine it in one groove, admitting no plants but such as have slender stems with the foliage elevated above the line of sight, as in Palms, the ground work being flat. For instance, tracery of flowers and foliage laid on the table cloth, so that the view all over the table may be as little interrupted as possible. Now, an uninterrupted view all over the table is not always desirable—in fact we believe that it is very often desirable, and very much facilitates dinner table intercourse, as in cases where the company is large, and, may be, to some extent socially and mentally grouped. This involves the use of very varied materials and arrangement. Table decoration is like flower-gardening a matter of individual taste. It is fashionable to decorate the dinner table with plants and flowers ; but how these are to be disposed on each individual table is at the will

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of the decorator for the time being. The taste may lie in the way of light and graceful decoration, or it may be in a grand and massive style. Each is appropriate in its place, and each may be carried out with faultless taste; for we must insist that a style which might be pronounced massive, or even heavy, may be so tastefully done as to be a complete success. We think that a hard and fast rule cannot be laid down as to what is good and bad taste in table decoration. The size of the table must always decide the extent and style of the decoration. If simply a round table fit to dine, say, six or eight individuals, a single central plant, vase or epergne may only be admissible, with a few baskets or glasses of small size for plants or flowers to fill up; or if of sufficient length and width to dine thirty or forty, much more scope is given for the exercise of detailed arrangements; but taste is as much wanted with the small as the large table.

Strictly speaking, there are three different styles of table decoration in vogue at the present day, each of which affords plenty of scope for any one to display their taste and abilities in the art, and which for want of better names we may designate as the heavy, light, and medium. To carry out the first, the material employed must all be in a growing state—plants of various kinds, both flowering and ornamental foliaged. The most common practice of making use of plants for decoration is the one of putting single specimens in vases, cups and other ornaments and covering over the surface with moss; but speaking for ourselves, we must say that we have a decided preference for arranging them in groups on circular boards, say one inch thick and from one to two feet in diameter. True this plan entails a larger amount of labour, comparatively speaking, and is far more destructive to the subjects used than in the one of placing single specimens in vases, since the plants must all be turned out of their pots, and in some cases the soil considerably reduced, and consequently to some extent the roots mutilated. It ought therefore never to be attempted except in those places where the operator has an extensive and varied collection of plants at command. Let the reader picture to himself for a moment, if he can, the difference between a single plant in a vase for the centre of a table, and a group arranged on a two-feet board, and made up of the following, *viz.*: Centre plant, Areca rubra, Kentia Fosteriana or any other light, graceful Palm, 2 or 3 feet high, with a row next it of Eucharis Amazonica and Dracæna hybridum or Cooperi; then you may use a plant or two of Adiantum Farleyense, or a small plant or two of any choice flowering subject; these in their turn to be followed by a row of dwarf Adiantums and Caladium argyrites, the whole to be fringed with a circle of Selaginella, the latter to be arranged so as to hide the board, and to droop gently over and come in contact with the cloth. There can be no question as to which of the two he would choose if he saw them. The whole of the plants should be arranged so as to form a pyramid. For a table large enough to dine from twenty to thirty persons there ought to be at least seven groups, three of the large size placed in a row down the centre of the table, the middle one being made up somewhat differently, and with a taller centre plant than the two end ones; and four of the small size, the latter being made up to match each other, and stood on the table in pairs, midway between the centre and end ones and about a foot outside the line of the same. The effect of such an arrangement must be seen to be fully appreciated. We will now take that style of decorating we have called light, and this, we may here remark, is the one more generally practised. The material which is used being all in a cut state, and consisting mostly of grasses, flowers and leaves. That dried grasses should be considered as almost indispensable in the dressing up of epergnes &c., is not to be wondered at, for if used judiciously they add much to the elegance and beauty of a floral arrangement; but to see them in such profusion as we sometimes do, reminds one more of a hay-field than a dinner-table. We would therefore strongly recommend their being used more sparingly than they generally are. On the putting up of cut flowers it is useless to make suggestions, as their arrangement depends not only on the quantity and quality of material available, but also the individual taste of the decorator. We may however remark that the fewer colours that are introduced into any arrangement the more simple the task of arranging them tastefully. We will not dwell on the point further than to remind those who still persist in walking in the old and more beaten tracks of the past, that it is not altogether the amount of material employed which makes the choicest and prettiest display, but it is rather the art of trying to imitate Nature to a certain degree, so as to produce that which by a proper blending of hues and tints, and with some regard to outlines, you may obtain that which may be fittingly described as an harmonious whole—light and graceful, and devoid of all stiffness and formality. The medium style does not call for any lengthened description or comment, it is simply a combination of the other two, both plants and cut flowers being used. To do it thoroughly a complete set of shallow tin troughs and pans about 1½ inch deep may be reckoned as a *sine qud non*. There are few things in table decorating which have a more telling effect than a number of these tins when arranged into various geometrical designs and figures and filled with Selaginella denticulata, Scarlet Geraniums, Verbenas, or other bright colored flowers. In connection with this mode of decorating there is one more point we must briefly allude to, namely, that of laying leaves on the cloth. This is frequently overdone; a single row round the table, with quadrants formed at the corners, we hold to be quite sufficient.

In our next we hope to make a few suggestions on the class of plants best adapted for Table decoration, also the various colours in flowers that can be harmoniously combined.

Editorial Notes.

AMONG the early Greeks it was a custom to leave bequests for the maintenance of sepulchral rose-gardens over the grave of the testator.

A DWARF tree, about one hundred years old, but only twenty inches high, is included in a collection of artificially-coloured plants recently received at the Acclimatisation Gardens in Paris. Chinese gardening is responsible for its dimensions, which are not those of the natural tree.

THE sunflower will absorb impure gases quicker than any other known plant, and will evaporate as much as a quart of water

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daily. On the banks of the Scheldt a landowner who sowed the plant extensively on his estate escaped altogether the miasmatic fevers which prevailed on the estates all round him.

Cotton, of which the manufacture in India dates from before historical times, had scarcely by the Christian era reached Persia and Egypt. Spain in the tenth and Italy in the fourteenth century manufactured it, but Manchester, which is now the great metropolis of the trade, not until the latter half of the seventeenth century.

The Value of Timber in the Highlands.—An illustration of the value of timber on waste lands in the Highlands is afforded by a sale of wood which took place on the estate of the Earl of Cawdor, in Nairnshire, the other day. In 1820, two hills on the Cawdor property of about 800 acres in extent, and of almost no agricultural value, were planted with Fir and other trees, and after successive thinnings, the sale of which realised large sums, the remainder of the wood has just been sold off for the sum of £16,000. The sums realised for the wood on this waste land during the fifty years is stated to be equal per acre to the return for the best arable land in the country.

Centigrade and Fahrenheit.—The Centigrade thermometrical scale is now becoming so frequently used in English books that a short method of turning incomprehensible Centigrade into intelligible Fahrenheit will be a desideratum. The rule is simple, and the operation, after a little practice, may be performed mentally. All one has to do is to double the Centigrade number, take a tenth away from it, and add 32 to the number obtained. Let us take 60° Centigrade. Twice 60 is 120, take one-tenth away, *i. e.* 12, and 108 remains, which, added to 32, makes 140, which is the answer. Taking a more difficult number, 32 Centigrade, we double and obtain 64, from which we take 6.4, leaving 57.6, to which we add 32, the total being 89.6.

Ants.—Mr. McCook brought recently before the Academy of Natural Science of Philadelphia an account of his investigations on *Formica rufa*. He finds that ants descending the tree-paths, with abdomens swollen with honey-dew, are arrested at the foot of the trees by workers from the ant-hill. The descending ant places its mouth in contact with that of the food-seeker, the two being reared on hind-legs. Frequently two or three of its fellows are thus fed in succession by one ant, mostly complacently, but sometimes only on compulsion. Mr. McCook made many experiments, which led to the conclusion that there is complete amity between the ants of a large field, embracing some sixteen hundred hills and many millions of creatures. Insects from hills widely separated always fraternised completely. A number of ants from various hills were placed in an artificial nest, and harmoniously built galleries and jointly cared for the cocoons.

Gentle Flora is holding high carnival in America as never before. The ranks of her devotees are swelling apace. Fashion bows low at Flora's nod, and wears her favors as rarest finery. No feast or fête is of any moment without freest decoration of flowers and rare plants. The exhibitions of the beautiful products of garden and greenhouse were never so large or so fully attended as this year. The fair Chrysanthemum alone now claims admiration for more than half a thousand varieties. Flora is lavish with her gifts to the poor and the rich alike. But poor folk get these delights by their own willing labors, while the rich are paying princely prices for the rare and costly beauties. The gentle goddess demands close and loving service, and she is now receiving it unstintingly from dames and maidens and stalwart men. Her gracious rule is spreading through the homes of the land, through the halls of fashion and the salons of art. May her banners wave at every window, and on every lawn, and her banner bearers be all who are fair or true.—*American Garden.*

The Grass-Tree.—Among the anomalies of Australia is a singular growth of the forest that deviates as much from a tree as a kangaroo from the ordinary types of animals, although it is called a tree. The grass-tree grows in rocky places unfavourable for other vegetable productions. Absolute barrenness is a spot where the plant flourishes best apparently, though elements must abound there which are appropriate nourishment. A mass of grass-looking fibres gradually rises out of the ground. From day to day there is an increase of bulk and height very much resembling an elevated tuft of long grass gracefully falling off from a central shaft. The pendent threads are leaves. Very soon from the top of the pile a slender stalk shoots up perpendicularly from four to ten feet, terminating in a spike. That is sought by natives for spears, being hard and somewhat elastic. Within the pith is an article of food. In the rude and savage condition of the indigenous Australians the grass-tree furnishes a weapon of extraordinary usefulness for meeting the circumstances of a barbarous state of society. Without it no other equally efficient instrument of defence against enemies or for contending with ferocious animals is at their command.

Rural Education in France.—Mr. Roger Leigh, in an address recently given at his Harvest Home at Barham Court, gave an interesting description of the course adopted with respect to rural teaching in France, pointing out that the children attending 30,000 primary schools in the rural districts received instruction in the culture of the soil. The child was shown the soil which best suited the plant to be cultivated; he was made to prepare it for planting, to sow it, to free it from weed, to wage war against insects and grubs, and finally to record in his school books the advantages derived from the selection of special soils, the application of new manures and variations in the time of planting. Those lessons were never forgotten, and the allotment of the French peasant was made to produce a variety of vegetables fit for any man's table. The various agricultural societies throughout France cordially seconded the Government in its efforts, by bestowing on the pupils and the master, counsel, assistance, and prizes. But in England all the energies of their representative system appeared to be absorbed by the consideration of the religious doctrine which should be taught in schools, while the material objects for which education was also required, were overlooked.—*The Garden.*

Burmese Palm Products.—A farinaceous substance, resembling sago, is obtained from the pith of several palms. Such are the talipat or *pepeu (Corpyha umbraculifera)*, another species (*C. Gebanga*), the *minho* (*Caryota urens*), the *toungong* (*Arenga saccharifera*), and the *mudaing* (*Cycas rumphii*). The coconut or *ong* (*Cocos nucifera*) is cultivated on all parts of the sea-board. The leaves of the talipat or pepeu are used as fans, and for writing on, in the latter case being pegged or sewn together, gilded sometimes in patterns on a vermilion ground, and rubbed with petroleum to keep away insects and damp. The leaves of the *minho* afford fibre, and the stem of the *mudaing* exudes a resin used in sores. The juice of the *htan* affords toddy, and therefore, by boiling down, sugar; and the trunk is applied to many uses. The leaves of the toungong yield fibre, the hollowed stem serves for pipes, and the juice drawn at flowering time gives toddy and sugar. These two last-named products are also derived from the juice of the *thenbounq* (*Phœnix paludosa*). The *dani* or water palm (*Nipa fruticans*) fulfils many duties; its roots bind the soil of the river banks; the leaf is universally employed in thatching; the juice is converted into toddy, sugar and vinegar; the fruit is eaten when ripe; the flowers are made into a preserve, and the branches are used as fuel. The prevalent habit of betel chewing renders the areca nut palm (*Areca catechu*) one of the most important of this very useful family.—*Journal of the Society of Arts.*

Fertilizers.—We are decidedly in favour of using good fertilizers, and cannot fail to speak a word for nature's method of making soil, and creating fertility, *i. e.*, green manuring. Nature's laws are immutable, and her teachings are infallible; but while we say this we are often painfully aware that we cannot

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satisfactorily fathom her philosophies. Nature creates soil by the process of green manuring, but we cannot explain exactly in what way she does it. Never mind: let the philosophy slide; we know it is so, and let this knowledge direct our movements and we shall be the better for it. Those who neglect this means of increasing the productiveness of their lands stand in their own light. We believe that the turning under of vegetable matter to decompose exerts an influence over the free fertilizers contained in the air and water and appropriates them; and on the well-known principle operative in many departments of nature that to "whomsoever hath more shall be given," a soil abounding in humus accumulates power to increase its fertility in exact proportion to the organic matter it contains. If this is so, and we challenge contradiction, what shall be said of those who persistently consume with fire all the waste vegetable matter produced on their land? Is it not unnatured-wasteful, injurious, in the long run fatal to the cherished wishes and expectations of the cultivator, and a sure way to ruin? We pause for a reply.—*Queensland Agriculturist.*

New Edible Fungus.—Mr. Colenso calls attention to the rapidly increasing value as an article of export from New Zealand of *Hirneola polytricha*. This mushroom, first described from the East Indies and Java by Montague, is of various sizes and shapes, some specimens measuring even a few inches. It is found in New Zealand growing on the trunks of trees, both on living and on decaying ones, especially on the latter while standing, particularly on the stems of *Corynocarpus lævigata* and on *Melicytus ramiflorus*. Both of these are endemic. The former is mostly confined to the sea-shore, where it often forms dense and continuous thickets The latter tree is scattered plentifully throughout the country. When dry, the mushroom becomes shrivelled up, and is as hard as horn; when wet, it is soft and elastic, almost sub-gelatinous. It grows in compact gregarious masses. The market for this fungus is China, where it is largely used by the Chinese in soups. It appears that another species of the same genus indigenous to North China has long been an article of commerce. Mr. Berkeley notes of our British species, *H. auriculajudae*, that it was once a popular remedy for sore throats, and adds that it is still occasionally sold at Covent Garden Market. The New Zealand species is plentiful, and obtained at little cost, the drying of it being an easy matter. Originally the price to collectors was a penny per pound; now it is nominally two-pence halfpenny, while its retail price in China is five times this. The *declared* value per ton at the customs ranges from £33 to £55 a ton, and is doubtless much below its real value. During the last twelve years some 1,858 tons of this fungus were exported, chiefly from the ports of Auckland and Wellington, and of a declared value of almost £80,000.—*Nature.*

Early Vegetables in New York.—"The Grocer" gives the following information in regard to the early vegetables sent to the New York market:—Among the first vegetables to arrive in this market is Asparagus. Our first supply comes from California, and is shipped in the ice cars containing salmon; it brings about 3s. per bunch. A little later on we receive Asparagus from Florida at 4s. per bunch. Gradually, as the season advances, our sources of supply work northward to Savannah, Charleston, Norfolk, until about the first of May, when the product of the New York market gardens begins to appear. California also has the honour of supplying us with the first Cauliflower, which is shipped in the same manner as Asparagus, and is worth when it first appears about 4s. per head. Among the most prominent of our January arrivals may be mentioned Cucumbers and Lettuces, the first arrivals of both of which we receive from Massachusetts. The first Cucumbers to arrive are very large, measuring from 12 in. to 14 in. in length, and cost sometimes as much as 10s. each. About the middle of June, when the season is at its height, ½d. each is more than can be realized by the New Jersey and Long Island product. Lettuces come also from the Boston hothouses, and are worth 4s. per dozen. In May we begin to receive Lettuces from Long Island at half that price. Canada also contributes her part towards supplying us with luxuries by sending down the finest Rhubarb and Mushrooms received here. The latter are grown in large galleries 20 ft. underground, on the estate of Col. Rhodes, near Quebec. Green Peas have begun to arrive in small quantities. Early Potatoes, Onions, and Tomatoes, come from Bermuda at first, and later in the season from Savannah, Charleston, and Norfolk.

The Rose of Jericho.—In a recent number of the "Gartenflora" a notice is given of a curious, but not by any means newly-discovered, annual inhabiting the sandy regions of Syria and North Africa, the Anastatica hierochontica, better known as the Rose of Jericho. The remarkable point about it is the curious and admirable adaptation of its habit to the very hard circumstances under which it exists. A mere annual in a desert has not much chance of perpetuating its existence, but this plant manages to do it. As soon as its seeds are well formed the leaves fall, the branches curl round and make a ball round the seed-vessel, and the roots soon become loosened. Then comes the wind and makes a football of it, hither and thither. During this time the seed-vessels remain closed, but the first rain causes the branches to unfold and the seed-pods to open. This is its chance, and a brief one, for the continued reproduction of an annual plant on the shifting sands of the desert must be speedy germination and quick growth. The strange prickly, almost or quite leafless, shrubs and under-shrubs characteristic of the desert flora retain their vitality for years alternately buried beneath the sand and exposed to the influences of the sun and air, but an annual plant would probably soon become extinct under the same conditions. According to a writer in the periodical above mentioned, seeds of the Rose of Jericho sown about five o'clock in the afternoon had germinated by one o'clock on the following day, and their rootlets had already pierced the soil. These seeds were taken from a plant purchased at the Vienna Exhibition, and twelve out of fifteen germinated in the time mentioned in a pot covered over with a saucer, and standing in an ordinary living room. So exquisite an accommodation to the necessities of its position is very striking.—*The Garden.*

Original Articles.

PALMS.

(*Continued from page* 200).

Calamus.

Calamus Kentiæformis.—A very striking novelty and one which is destined to have a great success. The habit of the plant recalls at once the form and character of the Kentia Fosteriana from which circumstance its name was given.

Calamus Lindeni.—This is one of the most striking Palms introduced up to the present time. The leaves are thick, of a brilliant green on the upper side and on the under of a beautiful white. Its habit is like that of a Calamus or Acanthophœnix, but no species of these two classes approaches it in beauty.

Calamus Sikhimensis.—An elegant Palm, introduced from Sikkim. The leaves are ovate in outline, pinnate, with many narrow lanceolate segments, supported by spiny leaf-stalks. The young leaves are of a pleasing cinnamon-brown colour, contrasting in a very marked manner with the deep green of the mature leaves. This handsome Palm will be exceedingly valuable for all decorative purposes.

Copernicia.

Copernicia (Corypha) cerifera.—This is the Carnauba Palm of Brazil, one of the most useful and hence valuable Palms known. The top, when young, is an appreciable and nutritious article of food; and from this tree also wine, vinegar and a saccharine matter are extracted, as well as a kind of gum similar in its tastes and properties to Sago. From the wood musical instruments are made, as also tubs and pumps for water. The delicate fibrous substances

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of the pith of the stalk and its leaves make a good substitute for cork. The roots have the same virtues as the Sarsaparilla. The pulp of the fruit is of an agreeable taste, and the nut, oily and emulsive, is roasted and then used as coffee by many persons. From the trunk are obtained strong fibres, and also a species of flour similar to Maizena, and a liquid resembling that of the Bahia Cocoa-nut. From the dried straw are made mats, hats, baskets, and brooms; and large quantities of the straw are exported to Europe for the manufacture of fine hats. Finally, from the leaves is produced the wax used in the manufacture of candles; and the export of this wax from Brazil exceeds £162,000 a year in value.

Corypha.

Corypha Gebanga.—A very distinct variety, native of Java, growing to an immense size. The petioles are very stout, and support large glaucous leaves which are divided fully half their length into narrow segments.

Corypha Talieri.—An Indian species of but little merit as an ornamental plant; its broad fan-shaped leaves are extensively employed in the manufacture of fans, umbrellas, &c.

Corypha umbraculifera, also known as *Livistonia umbraculifera*, is the celebrated Talipat Palm of Ceylon, where it attains a height of sixty to seventy feet, but is of very slow growth. The petioles are six to eight feet in length, armed with small brown spines; the leaf blade, which is deeply channelled, forms a complete circle 12 to 15 feet in diameter.

Corypha Australis.—See *Livistona Australis.*

Cyphokentia.

Cyphokentia macrocarpa.—This remarkable new Caledonian Palm is also known under the names of *Kentiopsis macrocarpa* and *Kentia Lindeni*. It is a noble plant, of vigorous habit, with a stout smooth stem, furnished with bold pinnate leaves which in the young state are ovate in outline and spreading, and are supported on stout purplish red leaf-stalks; the pinnæ or segments of the leaves are rather distant and oblong-lanceolate. The young leaves are of a deep olive crimson colour, and in this state add very materially to the effectiveness and beauty of the plant, which is at other times remarkable for its red petioles and broad leaf segments.

Dæmonorops.

Dæmonorops fissus—A very bold handsome variety, native of Borneo; the leaves are ovate in outline, armed with stout dark-coloured spines, the back is armed with a single row; the leaves are pinnate, and dark green, bearing on the upper side a few dark hairs.

Dæmonorops palembanicus.—An elegant plant for table decoration; leaves pinnate, armed below with reflexed spines; in a young state they are rich cinnamon, but change with age to deep green.

Dæmonorops periacanthus.—This graceful palm, a native of Java, bears a general resemblance to *D. palembanicus.* It differs, however, in having a greater abundance of spines, which group themselves in irregular rings round the petiole, a circumstance which has doubtless suggested the name; it differs also in the young leaves being almost straw coloured instead of cinnamon coloured.

Dæmonorops plumosus.—This graceful Palm is exceedingly handsome, either in a small or large size. Its leaves are of a rich dark green, and remarkably plume-like, hence its name. It is unquestionably one of the most elegant of the Palm family, and being of compact growth, is admirably adapted for vases and table decoration.

Desmoncus.

Desmoncus granatensis.—The species of this genus of Palms are peculiarly distinct in their appearance, having a pair of divergent leaflets at the top of the petiole. In the young plants of this species the petioles are terete and spineless, except at the top, where they bear a few setæ, and where are also seated a pair of lanceolate divergent pinnæ, nearly two inches broad, and of a lively green colour. It has been imported from Colombia.

Geonoma.

Geonoma Carderii.—A very beautiful Columbian species of rather recent introduction. It is distinct and highly ornamental. To grow this species, as also all the Geonomas, many of which are very beautiful, a high temperature is essential and plenty of moisture.

Geonoma gracilis.—An elegant dwarf-growing Palm of very pendant habit, resembling somewhat the beautiful *Cocos Weddeliana*; the pinnæ, however, are much longer. It will be found a useful plant for the dinner-table, as well as for geceral decorative purposes.

Heterospathe.

Heterospathe elata.—A very elegant Palm from Java. It is a smooth-stemmed species, and is remarkable for the length of the tapered segments of its pinnate fronds. The leaflets are half an inch broad, with somewhat wider intervals between them, bright green on both the surfaces, narrowing upwards into a long slender tapering point. The plant has a naturally graceful spreading habit, and ranks among the most ornamental of the pinnate-leaved series.

Kentia.

Kentia Australis.—Of exceedingly graceful habit, the leaves being pinnate, finely divided and elegantly arranged, and of a beautiful dark green. Native of Lord Howe's Island.

K. Belmoreana.—A graceful arching-leaved Palm, with long terete, shining, yellowish-brown petioles, which bear in young plants from 20 to 30 deep green strap-shaped pinnæ In a young state this is one of the most ornamental of Palms. Native of New South Wales, where it grows to a height of 35, ft. with leaves 6 to 8 feet long.

Kentia Canterburyana.—Few Palms are more handsome than this, and being of moderate growth, it is suitable for pot culture. It is a native of Lord Howe's Island; it is not an overquick grower, especially if somewhat confined as regards root-room, and consequently can be kept for a considerable time within the limits of a medium sized house. It should have a little shade in very bright weather, or the leaves are apt to become somewhat yellow, a circumstance which impairs their beauty. It forms a good centre plant for a moderate-sized house, contrasting as well with flowering as with other fine-leaved subjects.

K. Fosteriana—Only differs from the above in having bright green petioles, by which it may easily be distinguished from that species. A native of South Australia.

K. gracilis is a distinct species, having almost straight, stiff, guild-like petioles, bearing narrow linear pinnæ, which are thinly arranged and almost straight, giving the plant a rather stiff appearance. A native of New Caledonia.

Kentia Lindeni.—See *Cyphokentia macrocarpa.*

K. Macarthuri resembles K. Wendlandiana, but is a much more graceful, finer, dwarfer species. It produces offsets at the base by which it may be propagated. New Caledonia.

K. Wendlandiana.—A magnificent Palm which is likely to prove an effective exhibition plant. It is a robust grower with stiff channelled petioles which are clothed with meal-like scales. The leaf segments are broadish and of an equal width to the tip, which instead of being pointed is toothed or jagged like the fin of a fish; bright green and slightly arching. Queensland.

K. Luciani.—*K. robusta* and *K. costata* are new introductions, which we have not yet seen only in a young undeveloped state. They are described as being valuable additions to our collections.

Latania.

Latania aurea.—In this we have a Palm quite distinct from any of the foregoing, and invaluable to render a collection varied, as it is one of the best of its series. The petioles are stout, nearly erect, yellow, supporting large palmate leaves, assuming large proportions as they increase in age. It is indigenous to the Mauritius, but rather limited in its distribution. This is a superb species, deserving the attention of every cultivator of foliage plants.

Latania rubra.—This is undoubtedly the finest species of this genus. Native of Mauritius. The petioles are erect, spreading

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from 2 to 4 feet in length, quite smooth, and deep crimson. The leaves are palmate, plaited and of rich shining bronzy green, changing with age to dark green.

(To be continued.)

FRENCH MODE OF GROWING ASPARAGUS.

Propagation.

Asparagus is propagated either by means of seed or by division of the old clumps, the former being best: the latter is only used in the case of forced Asparagus. Many who raise Asparagus for sale, care little about quality, consequently they use what seed they may have, whatever may have been its origin, and sell the seedlings at one or two years old, a practice encouraged by buyers who would object to pay a reasonable price for superior stock The following mode of raising Asparagus wil be found to be in every way successful:—Select the best plants in a bed not under six years old, and do not cut any heads of it the season in which seed is to be saved; allow the finest heads only to run to seed, and when ripe select only the largest berries, avoiding the top ones; wash the seed out of the pulp, have a bed trenched 1 ft. deep in light, rich, well-manured soil, and on this sow the seed in January or February 1 in. deep in drills 1 ft. apart, and cover the bed with 1 in. of leaf-mould; five or six weeks afterwards the seed will come up, thin out the plants to 5 in. or 6 in. apart, and water them when necessary during the summer. The following spring these roots will be sufficiently strong to be transplanted permanently. Seeds are in some cases sown on the bed in which they are to remain; but that is not good practice, as it does not allow the seedlings to be selected and well cared for, and moreover the ground is in use one year earlier than it otherwise would be.

Asparagus grows best in a rich, sandy, fresh soil; if too calcareous or clayey, it does not answer. It also dislikes stagnant water, which must be drained off, and it requires more manure than most plants. It used at one time to be a luxury to have a bed of Asparagus, so expensive was it in the preparation. The bed used to be dug 5 ft. and 6 ft. deep; faggots of Broom or Furze were put at the bottom 1 ft. and 2 ft. thick; then the soil was replaced after being mixed plentifully with manure, the roots were planted. The result was that such beds lasted from thirty to forty years in good condition, instead of ten or fifteen, as they now do. Every one has his own mode of planting. In France, the general practice is to trench the bed 2 ft. deep, removing entirely 1 ft. of the soil, and laying it in a ridge beside the bed. Plenty of manure is then added to the remaining soil; the roots are planted 2 in. deep and 1 ft. apart, in rows 1½ ft., as under; and every year a layer of manure, and 1 in. in depth, of the surrounding soil, are thrown on the bed, so that when the bed is made level the roots are still sufficiently deep. During the third season a few heads are cut. London market gardeners plant the roots 1 ft. or 1½ ft. apart, in rows 2 ft. or 2½ ft., as under. The beds, which are 3 ft. wide, consist of two rows, each bed being separated from the other by a footpath or alley 2 ft. in width. Every year the soil of footpath is thrown over the bed, and in autumn immediately after the dry stems are cut, the soil is again taken off the bed and thrown into the alley. Under this system Asparagus of a medium size can only be obtained; but now-a-days people want

Large Asparagus,

which may be secured as follows:—Select a piece of ground for the beds of good quality; trench it thoroughly 2 ft. deep, carefully removing stones, roots, and anything else which may be injurious to the roots; mix with the soil plenty of manure or compost, and let it lie until the spring. In February, should the weather be favourable, form the ground in ridges 4 ft. wide and 1 ft. high, and in March or April, according to the weather, make a trench between each ridge a few inches deep, and plant on little hills or elevations 3 ft. apart, cautiously spreading out the roots, and covering them with 1 in. of good compost; then add an inch of fine soil. A stick should be inserted to protect the roots and to which the small stems can be fastened when they require support. Keep the ground clear of weeds and destroy all slugs, snails, and Asparagus beetles; the latter lays its eggs on the stems, and when the larvæ are hatched, they destroy the young plants. Hoe the ground over as often as may be required, and water two or three times during the summer with liquid manure if needed; never intercrop with any other vegetable. In the autumn, when the stems have withered, cut them down to 1 in. or 2 in. in height, and remove the soil from the roots, leaving only 1 in. or so of covering and put a layer of old manure or compost from 3 in. to 5 in. in depth over the roots. Thus covered the roots will never get injured by frost.

Second Year.—In February or March fork up and level the bed, leaving the roots about 5 in. or 6 in. of covering, or make small hills 5 in. or 6 in. high over each plant. Make good any plants that may have failed, and cover the whole bed with a layer of rotten manure or compost 3 in. or 4 in. thick; this will keep the soil in good heart and in an equable state as to moisture, therefore no more watering will be required; destroy weeds and insects, and tie the stems to their sticks in order to prevent the wind from shaking the roots. In autumn cut down the dry stems to a few inches above the ground; again make up the ridges, leaving the roots 1 in. or 1½ in. deep, and over all put as much manure as you like.

Third Year.—In February level the ground as in the preceding spring, and remove what was left of the stems, over each plant put a little hill of soil, and sticks will be no longer wanted, as the stems will now be sufficiently strong to resist the wind without support. A few heads may this year be cut for use from each plant, but cutting must not be continued later than the 15th of June. Every year in autumn and in spring the same operations must be gone through, as in the preceding season.

Fourth Year.—All the heads may now be cut for use, but be careful to discontinue cutting on June 25; after that allow all the stems which appear to run up. The roots having now attained full development, must be kept during spring 10 in. deep, consequently the hill of soil over each plant must be made accordingly. The cutting time being over, the bed may be levelled if preferred; every autumn apply plenty of manure, and every spring mulch between the hills with fresh manure to prevent the soil from becoming hard. Salt dissolved in water and applied in spring will be found advantageous; but be careful about applying chemical manures, which often prove fatal to the plants. All seeds should be picked off as early as can be done; do not let them fall on the ground in autumn, otherwise a quantity of useless young plants will appear to the detriment of the bed

The distances at which the plants stand apart may appear too great, but wide planting is the only secret as regards getting fine Asparagus; besides, the number of heads produced are double, and their size three or four times larger than they otherwise would be, thus showing a large balance in favour of plenty of room. The celebrated Argenteuil Asparagus, so largely imported to Covent Garden, is grown in a way similar to this. It is a practice in some provinces in France to plant Asparagus in vineyards between the lines of Vines. In this case the roots stand at 3 ft., 6 ft., and even 9 ft. apart, and though the ground may not receive any manure for twenty years, the produce is large and the quality excellent. Planting among Vines is chiefly done in Burgundy. Immense quantities of Asparagus have been planted in several parts of France and Germany for market purposes; they are for the most part cultivated with the plough, and supplied with chemical manure; the result is generally good. In order to ensure success, take up the plants from their seed-bed with every possible care; throw away every one cut or broken, and use only such roots as have a healthy appearance, and strong, well-developed buds; do not expose them to the air; on the contrary, put them into a basket in wet Moss immediately they are taken up, and keep them there until they are planted.

Cutting.

Asparagus should be cut when the heads just appear, or when they are 1 in. or 2 in above ground, according to taste; once a day is sufficient, or twice for those who like them white and very tender. It requires some practice to be quick at cutting. The straight French Asparagus knife is the most convenient, inasmuch as it does not spoil the young shoots below ground, which cannot be seen. Holding the knife in the right hand, follow the Asparagus until the blade touches the root; then cut and pull up the

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Asparagus, which must be held with the left hand. Where the quantity cut is small, the heads may be carried away at once, but market gardeners leave them on the ground and collect them afterwards. Asparagus can be kept for a few days buried in sand in a cellar, but it is neither so well flavoured nor so tender as when used as soon as cut.—*M. Guiheneuf in "The Garden."*

SEASONABLE NOTES.

CALADIUMS.—Where a larger stock of these is required any bulbs now started may be divided into as many pieces as there are crowns. By waiting till they break slightly into leaf this may be done without risk, provided they are kept dry for a short time, afterwards to give the cut a chance to heal over. Caladiums do best in a loose, rough soil such as fibry loam and leaf mould, so that their roots can ramble freely and water pass readily through. To render these of use for indoor decoration they must be gradually inured to more sun and air, otherwise their leaves soon drop and curl, giving them a shabby appearance and spoiling their beauty for the remainder of the season. Few plants are more effective for the embellishment of dinner tables, or similar purposes, than dwarf sturdy Caladiums, and where plants are much in request for that kind of decoration a good selection should be kept in suitable-sized pots. If subjected to plenty of light, their stems and leaves will become much stouter and more fully developed than when shade is employed beyond what is actually necessary to keep the plants from burning.

CHRYSANTHEMUMS.—Early struck plants of these should be regularly shifted on as they fill their pots with roots, so as to prevent any check to their growth, otherwise they soon lose their lower leaves and become shabby. Cuttings struck now will make useful plants if liberally treated, and will be found quite large enough for ordinary purposes. Being gross feeders, pot them in a rich stiff soil consisting of about one part of sweet rotten manure to three parts of good fresh fibry loam, rather inclined to adhesiveness than otherwise. In this they will make firm short-jointed growth, and retain their leaves well down to the pot, a point of much consideration in the cultivation of these most useful plants, and without which they present but a very poor appearance. To keep them in this desirable state they must never be allowed to suffer from want of water; and as soon as the pots get well filled with roots, liquid manure, if not too strong, will be found of the greatest use to them. An open situation, fully exposed to the morning sun, suits them best, provided it be not too much exposed to the wind, in which case the plants would be liable to injury as soon as their branches get about a foot long, as at that stage of their growth they easily break out at the joints. Choose a firm hard bottom on which to grow them, that it may be impenetrable to worms, which are otherwise sure to interfere considerably with the drainage, from the want of which Chrysanthemums always suffer. To shade the pots from the rays of the sun and prevent the too rapid desiccation of roots by currents of air acting continuously on their sides, they should be well packed round with ashes, or some other plunging material that will answer the some purpose.

DRACÆNAS.—These require plenty of light to develop their colours properly, and therefore should occupy a portion of the house not too much shaded, unless they can afterwards be placed in a better position to finish them off. By an occasional watering with manure-water, and keeping them constantly moist at the roots, they may be confined to very small pots without suffering in any way from the limited space afforded them. For general purpose, plants with single stems are mostly preferred, but to be effective they should be clothed with foliage down to the surface of the soil. Where any choice varieties have become naked and leggy, the stems should be bound round just below the leaves with some moss, which if kept constantly moist, will soon induce them to emit roots, when the tops can be taken off and potted in small pots. Plants so treated are far superior to such as can be propagated and grown in the ordinary way. Young plants generally have leaves small and but indifferently coloured, whereas those on old plants have attained their full size, and are then generally perfect in other respects. The beheaded stems can either be left to break again, or they may be divided into 1 in. or 2 in. pieces for cuttings, which will soon start into growth and form useful plants. Dracænas may likewise be increased by taking off pieces of the thick tuberous-looking roots that may generally be found in the ball of the plant. The time of re-potting affords a favourable opportunity for removing any of these for the above purpose, as with fresh soil the roots are soon actively at work again, recovering quickly from any slight check they may have received.

AMARYLLIDS.—Every needful attention should now be given to Amaryllids. After they have flowered, comparatively small pots will suffice; but still root cramping must not be carried too far, or the bulbs will not attain their proper size, and their increase by means of offsets will be less than if more vigour was infused into them. Where additional room is required, give pots an inch or two larger, using good fibrous loam, leaf mould, and very old cow manure in equal parts, in all cases disturbing the ball as little as possible. Keep the plants sufficiently supplied with water at the roots, syringing freely every day to keep down insects, and let them be fully exposed to the sun. This beautiful family has been too much neglected by amateurs in this country. Those who have not tried the experiment, have but little idea to what a state of perfection they can be brought with a little careful attention. We have had many bulbs this season produce two and three spikes each of five or six flowers, the individual blooms in one or two instances being upwards of eight inches in diameter. They were grown in the compost recommended above, and from the time the flower spikes commenced to appear guano water at the rate of two ounces to the gallon was given them at intervals of a week.

FERNS.—Plants that have not been re-potted for some time, and where it is not advisable to give them more root room, may be assisted by the application of manure water; but in all cases see that the drainage is effective, otherwise its application will aggravate the evil. If any plants are outgrowing their bounds either in pots or planted out, it is an easy matter to reduce their over luxurince by cutting away, more or less according to circumstances, their oldest fronds whilst in a green living state; this will be found to reduce the size of the fronds made afterwards in proportion to the extent it has been carried out. The different kinds of Lomaria, Asplenuims, &c., that throw up their young fronds in a batch may have, when these are fully developed, the oldest fronds, if unsightly, cut away.

ACHIMINES.—As soon as Achimines started early have made an inch or two of growth, they should be placed in their blooming pots or baskets, whichever are used. A few more should now be started, reserving a portion to be brought on later, for, if it is desirable to have them in bloom for a lengthened period, they must be started at different times.

EUPHORBIA JACQUINÆFLORA.—This is undoubtedly one of the most useful plants we have in our gardens, and should be more generally cultivated than it is at present. As soon as the young shoots have attained a length of from 4 to 6 inches, they should be taken off with a heel and be placed round the edge of a well drained cutting pot in light sandy soil. Unless taken off in this way with a piece of the old wood adhering, they are very difficult to strike, and not at all free in doing so even when that is done. As soon as a sufficient stock of cuttings is struck, cut back the old plants to within a few inches of the bottom in order to induce them to break again, when they should be re-potted. Where convenience exists for planting one or two out so that they can be trained over a flat trellis, they will afford a larger number of heads of bloom for cutting, much longer and finer in every way than such as are usually obtained in pots.

THE VEGETABLE GARDEN.

But little can be done in this department during the present month, unless it is to clear the ground of all exhausted crops, and digging up the soil as it is cleared, so that it may be in readiness to

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plant or sow the various crops of indigenous vegetables as soon as we have a favorable break in the weather. Where conveniences exist for supplying water liberally, Indian Corn may now be sown; but it is useless to attempt this if the plants are likely to be starved afterwards. We prefer the American system of planting in hills about three feet apart, placing a good quantity of manure on each: five or six grains to a hill are sufficient. When up thin them out, allowing three of the strongest plants to remain; thorough cultivation is necessary to secure a good crop.

Brinjals, ochro, &c., may be raised in a seed bed in a shady position, in readiness for planting out after the first copious rains.

FRUITS AND SEEDS FOR DRESS TRIMMINGS.

The use of natural flowers for decorating the person is instinctive among certain peoples, and a question of fashion among others. It is in Oceania especially that this taste seems to be nationally developed, and from the narrative of Cook we know that the Tahitian belles use in their toilet the perfumed flowers of the pua and tiare (*Carissa grandis* and *Gardenia Tahitensis*), whose dazzling whiteness renders still more marked the ebony blackness of their wealth of hair.

In Europe this custom is traditional in many countries. Women of fashion scarcely ever appear at a soirée or ball without wearing a camellia or an exotic orchid on their breast or in their head-dress, and so, too, gentlemen of "high life" do not go out without a boutonniere of white violets or Cape jasmine.

But natural flowers, being ephemeral, were once replaced in the toilets of ladies by artificial ones. The artificial flower industry originated in China, and from thence passed into Italy and afterwards into France. In course of time people got tired of artificial flowers for decorative purposes, and then imitation fruits made their appearance, and were worn in toilets of dowagers and mothers of families.

Now that fashion, that tyrant born of dress-makers, milliners and tailors of renown, obliges us to clothe ourselves according to accepted models, the kaleidoscope no longer suffices to find the most varied designs and most fantastic cuts for garbs or ornament.

In recent years pleasing objects have been borrowed from the animal kingdom, such as small birds and quadrupeds, and insects with brilliant colors and of strange forms. What formerly would have been a repulsive object (such as a great longicorn or beetle), is worn with ease by the belles of our time. The use of such objects of natural history however has been about confined to the decoration of head-dresses or the manufacture of jewelry.

As the need of creating new models is always making itself felt, one ingenious manufacturer, Mr. Collin, has turned toward the vegetable kingdom, and brought out an elegant and original style of dress-trimming made of certain indigenous and exotic fruits and seeds that no one would ever have thought of using for such a purpose. Instead of pendants made of wood and covered with silk or velvet, Mr. Collin uses dry fruits or seeds, which he has previously dyed, gilded or silvered.

In order that the effect may be good, it is necessary that the objects be not uniform. Their surface must be naturally carved and hollowed, and the projecting parts must detach themselves well from each other. The number of species now used is relatively large, but a selection of these will inevitably be made. Some patterns will be better liked than others, and ladies who are to wear these new trimnings this winter will be able to make their choice of them at the fashion stores. When such articles as these make their appearance, they often spread with surprising rapidity. It is now but a few days since the great dress-maker Worth adopted them, and the linen trade already has them in stock. We recently saw at Suzange's some linen aprons and collars ornamented with small groups of fruits and seeds prepared by the Collin process, and which produced a most pleasing effect. The idea has even occurred to apply these trimmings to furniture and upholstery.

In the manufacture of these articles the cones of several species of *Casuarina*, the tags of alder, as well as the naturally carved fruits of certain *Elæocarpi* of India and Australia, were first used; then came the fruits of the umbelliferous plant, *Œnanthe*, the spiral pods of Medicago, the fruit of the water caltrops, *Melia* and *Zizyphus*, the cups of the acorn, the involucres of the beech, the seeds of *Coix lacryma*, &c. The naturalist ought to be glad to see objects that form the base of his studies taking a direction favourable to the industry of his country. On another hand, these products themselves cannot fail to arouse the curiosity of ladies who have the instinct of observation. And, who knows? Perhaps a frock or mantle may prove a more certain propaganda in favour of botany than the most classic lessons on this gentle science!—*La Nature.*

CISSUS DISCOLOR FESTOONED.

It is not too much to say that this is one of the most singularly beautiful of stove climbers. When grown in a hot stove, where it ought to be, the leaves acquire that gorgeous lustre and colour which give the plant its splendid appearance; and it is only when it is allowed to scramble in festoons about the roof of a house, drooping its long tapering shoots here and there, that it is seen in its true character. To train it on a balloon-shaped trellis, as it often is for exhibition purposes, is about the worst way of growing it that could be conceived. The plant must have a high temperature and generous treatment, as it will grow 20 ft. or more during the summer months, and produce leaves splendid both in size and colour, and such as can be produced in no other way. We once grew it in this way in a warm Orchid house—running it round the house in festoons, and up and down the columns, never restricting it in any way, and it was a spectacle worth going miles to see. It is seldom that this Cissus is grown in this way or grown well, and though the leaves are always beautiful, it is only when it is growing fast and draped with plenty of young shoots and leaves, that a true idea of its beauty can be formed. It strikes freely from cuttings made from the points of the young growing shoots, and inserted in sand under a bell-glass, and plunged in a bottom-heat of about 90°. Young plants succeed best. We used to strike them annually in February, for the purpose referred to, and always had good plants. As soon as the cuttings were struck they were potted off in 4-in. or 5-in. pots, and again plunged in bottom-heat in a hot pit, and when the roots reached the sides of the pot they were shifted, for the second and last time, into 10-in. pots; the compost should be loam and peat in equal quantities, about one quarter well-rotted cow manure, and plenty of sand if the loam be heavy. After this they were put in the same pit again till established, and then removed to the Orchid-house about the middle or end of April, when the temperature of the house had attained to about the summer figure. A plant was set to each iron column, up to the top of which they ran directly, and then they were led round the house on both sides of the path with string, which is handier than wire for festooning. We are preparing plants in this way now for a similar purpose. It is too late now to put in cuttings, but young plants are cheap, and half-a-dozen are sufficient for a long house if treated as here directed. The only enemy almost the plant has is the mealy bug, but a little attention with the brush will keep it down if the plants be kept growing fast, as they then run away from it. Frequent applications of liquid manure will also be serviceable in promoting a quick and vigorous growth.—J. S. W. —*The Garden.*

LONDON OFFICE

OF

THE INDIAN GARDENER,

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EAST INDIA AGENTS,

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Correspondence.

TO THE EDITOR THE "INDIAN GARDENER."

SIR,—Your correspondent W. V., in your last issue, asks whether there is a Croton called Gibsoni, and to this query you have already replied; but it may interest him to know that one of the handsomest of the Barleria genus of shrubs vegetates under this somewhat personal designation. It is a pretty little shrub, and grows freely in these parts.

Yours faithfully,
R. R. M.

CHITTAGONG,
April 22nd, 1886.

ANSWERS TO CORRESPONDENTS.

FUNGUS ON ROSES (*Amateur*).—The leaves are seriously affected with the black fungus, syringe them with a solution of soft soap, 6 or 8 ozs. of soap being dissolved in a gallon of water, or nicotine soap 4 ozs. to the gallon, and when wet dust the affected parts with sulphur. Another remedy is to sponge the leaves with 2 ozs. of Blue vitriol (sulphate of copper) dissolved in hot water, and added to two or three gallons of cold water.

ROSE LEAVES BLISTERED (*S. I. M.*)—The foliage is deficient in texture and cannot resist the effects of the sun. The blistering is the most marked on Roses growing in poor soils, and especially on plants that have long occupied the same positions, and consequently exhausted the soil. Blistering is also caused in some instances by small grubs eating the foliage. Give your Roses copious supplies of liquid manure and mulch the surface with manure to retain the moisture in the soil, also examine the growths closely, removing any maggots that you may find. At the pruning season remove all the weak wood entirely, and shorten the young and strong shoots to induce more vigorous growth.

SUBSTITUTE FOR GRASS (*A. B. C.*)—We know of no satisfactory substitute for grass for forming lawns. Various dwarf growing plants have been recommended for that purpose, and though answering for a season, they sooner or later become patchy; neither is it of any use sowing seed or planting in those patches again, as all the nourishment have been extracted by the plants, and they have died of starvation; and the same fatality will occur to other plants of the same kind that is sought to be established, unless fresh soil is provided for their sustenance. It is different with grass, the roots of which die annually, and are converted into humus, and form a medium of supports for the new roots succeeding, hence the lasting character of grass lawns.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be repelled to should be sent in not latter than the Friday previous to the day of publication. All communications should be written in one side of the paper only. It is also requested that correspondents forward their name and address not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

ELECTRO-HORTICULTURAL DIALOGUE.

I have read with much interest the accounts which have recently appeared in the Press, of the experiments in electro-horticulture, conducted by Dr. Siemens and others On several occasions I have conversed with gardeners on the subject, and have been much surprised by their apparent indifference and almost hostility to the introduction of what seems to me to be a new and valuable aid to production. My own gardener, who is a fair and intelligent specimen of his class, seems to be particularly opposed to its introduction into my hothouses. The cause of this opposition I was, for some time, at a loss to determine; but a few days since I quite accidentally became acquainted with his reasons. One morning, in the course of my usual walk around the grounds, I entered my plant-house and sat down to read the morning paper, as is my custom. I had not long been there when my gardener, accompanied by a gentleman (who I afterwards learnt was an engineer desirous of viewing the hothouses), entered the adjoining compartment, and the door of communication being open, I could not avoid hearing the following conversation, which I give as nearly as I can remember its details.

Engineer. Why do not you persuade your employer to take up the matter of electro-horticulture, and have this range fitted up with apparatus for electric lighting?

Gardener. Why, you see sir, the view I take of the matter is this: At present I am a very successful grower. I understand what I am about, and I give my employer satisfaction; but if he were to adopt this new-fangled plan of growing by the electric light, he would expect much larger results, which perhaps I should fail in producing.

Engineer. But surely, my dear sir, the fear of failure is a very weak reason why one should abstain from trying to obtain desirable results. If all the world were to be actuated by such a principle, progress and invention would be at an end, and art, science, agriculture, and horticulture would remain stationary. Again, the results in this case are not doubtful; for the fact that great advantages accrue from the use of the electric light has been incontestably demonstrated. It has been clearly shown that the leaves are greener, the fruit finer, more quickly ripened, and that instead of only one crop (often a poor one), two, or even a succession of crops, may probably be obtained in a year. Again, the electric light will enable the gardener to have production more under his control, and to remedy the want of sufficient sunlight in winter weather.

Gardener. Well, you see, sir, I should be meddling with what I don't understand, and—

Engineer. But the whole thing is extremely simple, readily learnt, and easily managed by a person of ordinary capacity. Gardening has, as yet, been too much conducted on rule of thumb principles on old-fashioned lines; but now a grand opening is presented for improvement—a great opportunity for the gardener to elevate himself into a scientific horticulturist.

Gardener. But why should I put myself to all this trouble and bother? The introduction of this system here would entail a large amount of extra trouble and anxiety upon me, for which, as far as I can see, I should obtain no corresponding personal advantage.

Engineer. That I think is hardly the way to look at it. Do you take no pride in your business? Are you indifferent as to whether you excel in it or not? Are you content to stand still while the age progresses—to be behind the age in which you live—to remain stationary while more enterprising spirits pass you and leave you behind? This new discovery is, in all probability, destined to revolutionise horticulture. Its general adoption is only a question of time. Do you then intend to let prejudice or indifference prevent you from adopting it until force of circumstances compels you to regret your inactivity, or will you become a pioneer in the good work?

Gardener. But consider the expense.

Engineer. That is trifling after the first outlay; besides, an outlay should always be considered with reference to the results obtained. In this instance the results would constitute first-rate interest on the amount expended; for, instead of only one crop in a year, you would be able to produce two. Then the first cost is not so large as you might imagine, especially when, as in your case, there is already steam-power on the estate. Many gentlemen have steam-engines at their farms, and these are often within available distance from the gardens, so that wires could readily be laid down. This new use for steam-power will doubtless cause many gentlemen who do not already possess it to consider whether it will not be worth their while to purchase an engine. Again, who knows but that some of our horticultural engineers may not shortly hit upon a scheme for obtaining both light and heat from the same source?

Gardener. But, sir, plants require rest; they cannot go on growing night and day without rest.

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Engineer. True; but it is quite easy to give them rest when they want it, or to have a supply of recruits to take the place of exhausted plants.

From the above conversation it seems to me that the principal reason of opposition to electro-horticulture is the fear that it may entail a little extra trouble, and a certain sluggishness in adopting new inventions, which is perhaps a characteristic of the English race. However, in spite of opposition, I think of adopting it, and may perhaps on some future occasion trouble you with an account of the result.—*Electro-Fidelis.* [We think the average gardener is at present justified in waiting the result of experiments, carried out on commercial principles. At present it is only a scientific experiment, but decidedly a most promising one. EDS.]—*Gardener's Chronicle.*

LIQUID MANURES.

Liquid manures as a rule, especially among amateurs, do not receive the attention they deserve. All experience leads to the conclusion, that manure, of whatever description, is the quickest in its action when applied in a liquid state, consequently, when any crop gives evidence of an insufficiency of support, there is nothing so effectual as liquid manure; this particularly applies to kitchen-garden crops, where the necessary application is practicable. In fact, there are some vegetables that, in their more advanced stages of growth, can only be brought to perfection by the use of liquid manure judiciously applied. The French summer salads that are held in equal estimation with those they produce in winter, owe their excellence largely to the rich liquid with which they are unstintingly supplied. Lettuces, Radishes, and even Mustard and Cress, that are grown quickly by the use of liquid manure, are as different as can well be imagined from the tough, flavourless, indigestible material of which an English salad is too often composed. The comparatively large plants in the smallest of pots, unsurpassed in their way, which the growers for Covent Garden Market turn out, are striking examples of what may be accomplished by means of liquid manure alone. Liquid manure is also used with excellent effect for Pine-apples, Cucumbers, fruit trees of all kinds in pots, in short, for all plants in pots that require stimulating.

Gas Liquor.—The ammoniacal liquor obtained from gasworks may be used with excellent results in places where its peculiar odour does not render it objectionable. It consists of a solution of ammoniacal salts which constitute its principal value, and a number of other compounds which, if they do no good, do little harm. It is very caustic, and must be diluted with at least six times its bulk of plain water. Even then it must be applied cautiously to delicate plants, otherwise they will become burnt up. If much of it be used, sulphuric acid (oil of vitriol) should be added, in the proportion of a quarter of a pound to every gallon, to fix the ammonia. The diluted solution forms an excellent manure for Grass, to which it may be applied in the proportion of 100 to 200 gallons per acre.

Guano.—Dissolve 50 lb. weight in 10 gallons of water, and of this strong solution add ½ pint to every 10 gallons of water.

Mineral Liquid Manure.—A solution of sulphate of ammonia, a quarter of an ounce to the gallon, is much recommended. M. J Joannel, an eminent French agricultural chemist, recommends the following formula, but it does not seem to have worked so successfully in other people's hands as in his own. The manure consists of the following:—

Nitrate of ammonia	400	parts.
Nitrate of potassa	250	„
Biphosphate of ammonia	200	„
Chloride of ammonium	50	„
Sulphate of lime (gypsum) ...	60	„
Sulphate of iron	40	„
	1000	

The salts should be pulverised separately, and then intimately mixed. This manure is applied in the following manner:—Dissolve 62 grains in a litre (1¾ pint) of water; give to the plants, according to their state of development, every week from 387½ to 975 grains of this solution (equal to from 1½ to 9 grains of the salt in solid state.)

Solution of Cow Manure.—One part by weight of cow manure mixed with four parts of tepid water, of which 1 pint weighs 1¼ lbs., forms an excellent liquid for watering Vines, Peaches, standard Apple and other fruit trees, and for strong growing vegetables such as Cucumbers, Celery, Cabbage, &c.

Solution of Sheep-Droppings.—The proportions in this case are 1 peck of fresh manure to 30 gallons of water. The mixture should be well stirred, but allowed to settle before using.

Solution of Soot.—A liquid manure formed by adding 6 quarts of soot to a hogshead of water, is very serviceable for watering stove plants, Pines, Vines, forced plants generally, as well as most bulbs and flowering plants and shrubs.—*Quin's Garden Receipts.*

STRUGGLES OF A NEW YORK FLORIST.

At the beginning of the year 1805 ladies first showed a taste for flowers in New York, and in the fall of that year, when the plants needed shifting preparatory to their being placed in the parlour, I was often asked for pots of a handsomer quality or better make than those commonly employed. I was looking round for some other means to support my family, and all at once it came into my mind to paint some of my common flower pots with green varnish paint, thinking it would better suit the taste of the ladies than the common brickbat-coloured ones. I painted two pairs, and exposed them in front of my window. They soon drew attention, and were sold. I painted six pairs: they soon went the same way. Being thus encouraged I continued painting and selling to good advantage. This was in the fall of 1802. One day in the month of April following I observed a man for the first time selling flower plants in the market. As I carelessly passed along I took a leaf, and rubbing it between my finger and thumb asked him what was the name of it; he answered, "A Geranium." This, as far as I can recollect, was the first time I ever heard that the flower in question was a Geranium, as before this I had no taste for nor paid any attention to plants. I looked a few minutes at the plant, thought it had a pleasant smell, and that it would look well if removed into one of my green flower pots to stand on my counter and thus draw attention.

Observe, I did not purchase this plant with the intention of selling it again, but merely to draw attention to my green pots, and let the people see how well the pots looked when the plant was in them. Next day someone fancied and purchased both plant and pot. The day following I went when the market was nearly over, judging the man would sell cheaper rather than have the trouble of carrying his plants over the river, as he lived at Brooklyn, and in those days there were neither steam nor horse boats; accordingly I purchased two plants, and having sold them I began to think something might be done in this way, and so I continued to go at the close of the market, and always bargained for the unsold plants. The man, finding me a useful customer, would assist me to carry them home, and show me how to shift the plants out of his pots and put them into the green pots if any customer wished it. I soon found by his tongue that he was a Scotchman, and being countrymen we wrought into one another's hands, and thus from having one plant in a short time I had fifty. The thing being a novelty began to draw attention, people carrying their country friends to see the curiosities of the city would step in to see my plants. In some of these visits the strangers would express a wish to have some of these plants, but having so far to go could not carry them. Then they would ask if I had no seed of such plants; then again others would ask for Cabbage, Turnip, or Radish seed, &c. These frequent inquiries at length set me thinking that if I could get seeds I would be able to sell them; but here lay the difficulty. As no one sold seed in New York none of the farmers or gardeners sowed more than they wanted for their own use, there being no market for an overplus. In this dilemma I told my situation to the person from whom I had always bought the plants in the Fly Market. He said he was now raising seeds with the intention of selling them next spring along with his plants in the market, but added that if I would take his seeds he would quit the market and stay at home, and raise plants and seeds for me to sell. A bargain was immediately struck. I purchased his stock of seeds amounting to fifteen dollars, and thus commenced a business on the 17th of September, 1805, that became the most extensive establishment of the kind in the western world.—G. THORBURN.—(*From the "Secret of Success."*)

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ORANGE AND LEMON CULTIVATION IN SICILY.

Consul Woodcock, of Catania, states that oranges and lemons are designated in Sicily, *marina* and *montano*, the former growing in the lower altitudes near the sea, and the latter on the mountains. The montano, or mountain fruit, is the choicest, and commands the best prices in the market, but the crop is not so sure, owing to the frost. The marina orchards bear more abundantly, and the crop is more certain. In commencing an orange or lemon orchard, the following is the method adopted: First, the seed of the bitter orange is planted, and when the young plants are a year old, they are transplanted. When they have grown to be about one inch in diameter, that is, when they have attained the age of 3 to 4 years, they are again transplanted, and placed in the orchard where they are intended to remain. The tops of the young trees are then cut off about 4 feet above the ground, and when they have taken firm root, the best varieties of the orange and lemon are budded upon the stock. Two buds are generally inserted, and upon opposite sides of the plant. From these buds branches shoot out, and when a quarter of an inch in thickness, become of a reddish color. The distance to be maintained between the lemon trees in the orchards depends upon the situation of the ground and conditions of the climate and soil, usually it varies from 13 to 19 feet. When the soil is loose, rich, and easily cultivated, the lemon trees are planted at least 19 feet apart, as they will then grow luxuriantly and attain considerably size. The distance to be mantained between the orange trees is from 13 to 14 feet, and this varies in accordance with the situation and quality of the soil, as in the case of the lemon. The ground in the orchards between the trees is always cultivated, and great care is taken to keep it scrupulously clean.

The soil is worked at least 5 times a year, commencing in March and ending in October. When the trees are young and small it is not considered necessary to work the soil, as it is believed that the vegetable growth protects the young plants from the powerful rays of the sun. The annual cost of cultivation in the best orchards per hectare (the hectare being equivalent to 2·47 acres) is estimated at about £30, but where extraordinary outlays are necessary, such, for instance as is incurred when there are streets running through the orchards, as is often the case in the lava-covered soil of Sicily, or through the necessity of obtaining steam power for irrigation, the cost per annum is sometimes as much as £80 per hectare. On the average a lemon tree produces in Sicily 1000 lemons annually, and an orange tree 600 oranges, and cases have been known where trees have produced ten times this amount of fruit. The trees are subject to various diseases. A parasite growth of a fungus nature frequently appears upon the back, and the lemon tree is more subject to this than the orange. This growth, after heavy rain, or after being soaked in water, can be removed by scraping. The fruit of both the orange and lemon trees is also sometimes injured by a small insect which makes its appearance at the beginning of summer, and commences its work of devastation by depositing its eggs in the fruit itself, and these develop into grubs, which entirely destroy it. As a preventive, tar water, and water slightly tinctured with kerosine, are used to wash the leaves and fruit, and soda ash is also frequently employed. In picking the fruit for exportation, which is usually done by hand in the month of November, the greatest care is taken to avoid bruising or injuring it in any way by rough handling, and it is then placed very gently in baskets lined with cloth. The stem is left on the fruit, cutting it about a quarter of an inch from the surface of the fruit. Before placing the fruit in the boxes, all insects and other injurious matter are removed. The boxes generally used are capable of holding from 250 to 360 oranges or lemons, and are made with a partition in the centre. They are lined with common silk paper, and each orange or lemon is encased in the same kind of paper before being placed in them. The boxes are not made air-tight, but interstices are left between the boards for ventilation. Lemons gathered in the month of November, and thus packed, are supposed to keep without spoiling for six months, but oranges will not keep so long.—*Scientific American.*

INDIAN GRASSES.

All who have read Mr. Symonds' articles on the grasses of the Madras Presidency, and on Army Animal Management, which appeared in the *Quarterly Journal of Veterinary Science in India*, will be glad to have them in the more complete and convenient form in which they are now published. In the present work the most important grasses of the whole Indian Peninsula are described, and figured with special reference to their use for fodder, and though, of course, a complete list of the Indian grasses cannot be expected, it will, we think, be found that all those known to be of value are included. Of course such a work must be in the main a compilation from other writers, but it needs a wide knowledge of the subject to make the compilation satisfactory, and we can congratulate Mr. Symonds on his success in this respect.

It appears that the most important of the fodder grasses of India is the *Cynodon Dactylon*, known in this part of India as hariali grass, and in the north as dhoob. It is the same as the couch grass of Australia and America, and grows well in all parts of India. This grass is treated of at considerable length, and many useful details are given regarding its cultivation. Perhaps the most interesting part is a quotation from a report made by Major General Ottley upon some experiments which he made at Vellore on its cultivation on a fairly large scale. The soil was first very carefully prepared and manured, care being taken to remove all the roots of the corra (*Cyperus Rotundus*), a most troublesome weed, which is often found growing along with the hariali, and which can hardly be eradicated after the latter grass has been planted. In the ground thus prepared the hariali roots were planted in furrows, and the whole was then laid out in beds, so as to allow of irrigation from wells in the compound. At the end of about a month the first crop was ready for cutting, and by the judicious use of irrigation—once or twice a month—it was found that eight crops could be obtained in a year. Each crop yielded on an average two tons to the acre, so that it is well within the limits to say that 80 tons per annum can be obtained from 5 acres of ground properly attended to, and this yield is sufficient to render the crop a profitable one, even when we take into account the very heavy first cost of preparing the ground. On the produce of his five acres General Ottley was able to keep eight or nine horses and sheep, and to supply hay for the racing studs and livery stables at Madras; while during the last Burmese war, at a time when there was not a blade of grass in the country, he supplied all the hay needed for the Horse Artillery sent to Rangoon. Experiments made at the Sydapet Farm on a plot of 3 acres in 1868, showed, that a fair crop could be obtained even without irrigation, for from this plot 8 tons 13 cwt. of hay was obtained during the year. This hay sold for R360, while the cost of curing it was only R105. The hay made from hariali grass is of an excellent quality if care is taken to carry on the drying properly. The grass ought to be cut immediately after the flower appears and, according to Mr. Cameron of Bangalore, the cutting should be done in the cool hours of the day, so that the newly mown grass may not be exposed to the intense heat of the mid-day sun, and the drying should take place very slowly. But this is evidently a point on which "doctors differ," for Mr. Robertson, of Sydapet, gives advice which is very nearly the opposite of this, as he advices that the grass should be cut in the morning after the dew is off it, that it should then be left lying for an hour or two, and finally be turned and tossed about till sunset, for "it cannot," he adds, "be tossed too much during a hot sun." In dry weather two days of this treatment should fit the hay for being stacked. Our author does not attempt to decide between these diverse opinions, and neither will we, though we must admit that Mr. Robertson's advice seems to agree with the best practice at home. A point which is not generally known with regard to hay is that it is decidedly advantageous that it should heat slightly after it is stacked, the fermentation that takes place in that case improving the quality of the hay as fodder, just as coarse grass is improved by fermentation in a silo. But of course care must be taken that this heating does not go too far. Mr. Robertson suggests the use of a single row of six inch drain pipes placed about the middle of the stack, and leading from the centre to the outside. But drain pipes are not things that are usually to be found in this country, and they can be replaced by hollow bamboos or split palmyra stems, or the stacks may be built round a "centre," as is so often done at home. Hay which has been well made, attains its maximum value from eight to twelve months, and after fifteen months begins to deteriorate, and by three years it is useless for fodder.

Another very valuable grass is the guinea grass (*Panicum Jumentorum*), a native of Guinea, but thoroughly acclimatized in this country. Not only does this grass yield a very large crop of a quality admirably

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suited for feeding horses and cattle, but it has the power of resisting the longest severest droughts. This was well shown on the Sydapet Farm during the last famine. A field of two acres was planted in September 1877, and in May 1877 it was perfectly brown, and to all appearance lifeless, when the heavy rain which fell during the cyclone in that month led to its immediate revival. Before the third day of the rain was over, green shoots appeared all over the field, and in two months it yielded a crop weighing 5,566lb, followed two months afterward by a second cutting weighing about 12,000 lb. The popular idea that this grass requires to be irrigated, and that it should be taken up and replanted in fresh ground at the end of every two years or so, is situated to be quite erroneous. Of course irrigation will increase the yield, and any grass which grows so quickly requires an abundance of manure. The plants, too, soon become too large, and ought to be divided into four with a spade by two cuts at right angles through the centre, three of the parts may then be removed and the fourth left where it is. A subject on which Mr. Symonds has a very decided opinion is the present most unsatisfactory state of the system of obtaining grass for horses by means of grass-cutters. In Bengal the grass-cutters are men who are regularly enlisted and serve for a pension, but in Madras and Bombay in the army as well as in private stables, the grass-cutters are women who are generally the horsekeepers' wives. All who keep horses know how difficult it is to have any real control over these women, and how badly they usually do their work, and that there is much need for an improved system. In connection with this we are glad to see that Mr. Symonds calls prominent attention to the very common error that the roots of grass are best for horses. If the roots are young and small they certainly possess a considerable amount of nourishment, but old roots are always mixed with the young, and these are not only innutritious, but are actually hurtful. The following directions, regarding grass seem worth quoting for the benefit of private horse owners. "The grass should be brought in dry, laid on a trellis frame, beaten to remove dust and dirt, and it is then fit for use. Perfectly dry grass is not always possible, of course in the rains it is impossible, then they should bring in 20 lb. extra, take every advantage of getting it dry, keep it two or three days, then beat it and use it. In very wet weather, when there is continuous rain, to keep it would only induce fermentation, but as soon as there is a break in the weather, the drying should be assiduously attended to, and it cannot be laid out too thin." The practice of grubbing up the grass with a mamoty is strongly condemned not only on account of the number of roots which are thus mixed with the grass, but also on account of the destruction of the grass; but this latter objection can hardly be maintained in view of the experiments recently made at Lucknow, where it was found that by scraping the surfece, as practised by the natives, an advantage of 10,320 lb. per acre per annum was obtained over the plan of allowing it to grow, and then cutting it with a sickle These experiments were made on hariali grass. In conclusion we may call attention to the sixty-two admirably executed lithographic plates of the various gasses described, which, taken along with the text, facilitate the identification of each grass, and greatly add to the value of the book.—*Madras Mail.*

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Editorial Article.

FLORAL DECORATIONS.

Plants suitable for Table Decoration.

Plants and flowers have become intimately associated with our every-day lives : we have recourse to them in seasons of social enjoyment, and in the hours of sorrow. They have long been plucked for the babe, and strewn on the path of the bride, and on the graves of the dead. They delight the child and raise the shout of admiration from its lips; they tax the intellect of the mature and learned, and as they come and depart with the seasons, give lessons of wisdom to all, and whatever may be said for or against the fashion in which dinner tables are now decorated with plants and flowers—to a moderate extent, and tastefully associated with fruits, there cannot be a question that the effects produced are exceedingly pleasing to the eye, and calculated profitably to excite the mind. Be this as it may, we leave that phase of the question, dinner table decoration with plants and flowers has become so widely spread and general that you will find it practised in all classes of society.

Fortunately the class of plants—namely fine, graceful foliaged plants, which are found so very useful and effective for this order of decoration, has very much increased of late years. Associated on tables with epergnes filled with flowers, and frequently without such extraneous aid, they are productive of the most pleasing effects, the majority of plants which principally display beauty in their blooms being less suitable, unless, indeed, they are trained into forms not natural to them. This takes time and labour in tying and training, and more than likely, after being once used, their blooms are so tarnished as to render the plants of no avail for the season. Besides persistent leaved, and some berried plants of graceful habit, are, as a rule, more effective on a white ground, especially when cut flowers are included in the designs.

It may not be too much to say that the choice of plants often made is not what it might be, with more pleasure and profit to all concerned. Fortunately many of the most suitable plants for the purpose are, in a general way, readily grown, and not very easily injured by the exposure to which they are subject. There are however some points of importance in growing plants for this as well as for all special purposes, the aim in this case being to produce plants of some considerable size—having health and freshness—in smaller pots than are needed or desirable for general purposes ; and the requirements of some plants are much more easily supplied than others under such circumstances. Some things have long been stereotyped as table plants, and are made to do duty everywhere and on all occasions, such as the many variegated foliage Begonias, Marantas and other things in the coloured way. They are like the Croton in our gardens, which every-

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body has and everybody must use, and which for this reason has long become stale; they however recommend themselves as being showy, easily stuck in a vase, and lo! the table is decorated. Simple materials are, as a rule, the most useful; to place a rare and expensive plant on the table because it is new or rare is not decoration. The former when skilfully arranged, producing an elegant whole, are much more likely to please the eye of taste, and through it reflect credit on the artist, than employing rare and valuable plants to concentrate the attention on their individual selves.

It would be impossible to travel over the whole list of beautiful plants that are available for table or room decoration. The two genera of Croton and Dracæna are of themselves large enough to furnish any conceivable form or habit of plants, and their beautiful markings are not less striking than the graceful habit of such varieties as C. Warreni, C. Princess of Wales, C. Prince Albert Victor and their congeners. Or who shall say which of the beautiful forms of Aralia of the *Veitchi* type, or of Palms such as Cocos Weddeliana, Geonoma gracilis, or Kentia Belmoreana, make the finest table plant? All are very beautiful both in colour and form, and only require discreet arrangement to produce the most chaste effect. Pandanus Veitchi or P. Javanicus is almost indispensable where maroon or chocolate is the prevailing colour; Acalyphas also must not be forgotten, their broad ruby-coloured leaves being exceedingly handsome when in a perfect state, and arranged in silver or light coloured vases with which the colours will contrast.

Almost all sorts of Ferns are indispensable subjects, especially Adiantums, batches of which are easily grown of any size. Mosses and Selaginellas, especially S. denticulata, are also in great demand. Then again there are Caladiums, Alocasias, Dieffenbachias, and a host of other subjects, which when well grown may be called into requisition. Amongst flowering plants, Eucharis Amazonica, Pancratium fragrans, Chinese Primulas, when well grown will frequently be found a welcome relief to the bronzed leaves of many foliage plants, but as we before remarked, where the arrangement is of a composite character, that is, embracing both growing plants and cut flowers, plants in bloom should not be employed. Then again there are certain plants that are very useful for twisting round the upright stems of stands used for the decoration of the dinner table, for hanging round vases, high ornaments, or among branches of epergnes and chandeliers. Of these there are various Passifloras, especially the common one, Lygodium scandens, Antigonon leptotus, and the variegated Japanese Honeysuckle,—all of which are of easy culture. Tradescantia Zebrina and Pellionа Daveanana answer admirably for the top dishes of stands or epergnes, allowing their trailing shoots to hang as a fringe round the edge. For this purpose cuttings should be struck in very small pots and allowed to hang over the side of the pot till rooted, and then shaken from the soil and laid round the dish, with a little silver sand about the roots. The heads of the plants should hang over the sides, and they will grow freely, lasting for months if required; of pendulous growth and variegated foliage, the effect is charming and effective.

One of the first things which suggests itself when a Palm or other plant is to be placed on the table is, how is the pot to be hid in the absence of a vase in which to insert it; or if it be desirable to hide it in some other way, there is no more pleasing method than covering it with green Selaginella; but to pile or tie it against a pot is a very inelegant plan, to say the least. TheSelaginella should have been prepared months before wanted—grown into shape in fact. The following is the method we adopt for this purpose; a wooden circle, say 12 or 15 inches in diameter, is cut from a board about an inch thick, and a rim of perforated zinc, 1½ inch deep, is fixed round it, and this forms the foundation for the reception of such plants as may be desired or preferred. An empty flower pot, say 5 or 6 inches in diameter, as may be required for the centre plant, is placed in the centre of the board, and the space between the rim of the stand and the flower-pot is filled up with moderately rich soil. This is so placed as to form a slope from the top of the pot to the zinc rim, and is then planted with the Selaginella. When finished place in a cool shady position, and in due time any required number of nice green envelopes for plants will be at command. When wanted lift out the empty pot and insert the Palm or other plant, and place the whole on the table. The surface may then be dotted with flowers, if desired, and with sprays of Fern. This is a very elegant way of covering the pots or balls of earth in the absence of suitable receptacles. The same kind of envelope can be formed with such plants as Tradescantia multicolor, Fittonia Pearcei and Argyroneura, Selaginella apoda, or Cyrtodenia fulgida, in fact with almost any free growing trailing plant.

When a table is of sufficient size, a good variety of designs can be made with a plateau of plate glass covering the whole of the middle of the table, on which lakes and lawn and rockwork can be produced in miniature to imitate a landscape view. Small ferns and lycopods are indispensable for this kind of work, which must not be attempted without a great variety of small plants specially got ready for the purpose,—Selaginella serpens and S. denticulata grown in broad shallow patches, so as to be easily turned out in match pairs, and healthy tufts in small pots for filling in. We have seen designs of this description frequently arranged on the table cloth, and they have a novel and very grand effect by candle light. In the present article we have confined ourselves mainly to decorations with Plants; in our next issue we hope to deal with the employment of Cut Flowers for this purpose.

Editorial Notes.

If there be one pursuit more than another wherein the guiding rule ought to be "Never defer until to-morrow that which can seasonably be done to-day," it is gardening; and where gardening operations are thus carried out, the fuller will be the measure of success.

The weight, says an American writer, affords the easiest test for the purity of guano. A bushel of pure Peruvian guano, according to most authorities, should weigh almost exactly seventy pounds. If heavier than seventy-three pounds, it is adulterated with clay, sand, marl, or some other impurity.

Tea in the Punjab.—The cultivation of tea in the Punjab or rather in the Kangra Valley is making considerable progress. During last year there were 1,925 plantations of which 34 were

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new. As many as 1,880 gardens are owned and worked by natives of India. The total area under tea during the year was 8,172 acres, of which 6,430 acres were under mature planting. Other 1,756 acres have been taken up for planting. The outturn for the year reached 1,334,002 lb., showing an increase of 34,000 lb.—*Indian Agricultural Gazette.*

Seedling Fruit Trees.—Seedling Apples, Pears, and possibly other fruits may, under the conditions of the soil and climate, &c., of the districts in which they have originated, be found to be possessed of qualities which they will not retain when transferred to other localities where similar conditions do not exist; while on the other hand, varieties may have been discarded on being found of little value in the locality where they originated, but which might, under the influences of other soil and climate, be found to be possessed of desirable qualities.—*Gardeners' Chronicle.*

Worms in Manure.—These should be got rid of, particularly if the manure is intended for potting purposes. The best way to effect this is to turn the manure, and add to it while doing so a few bushels of gas lime, that is, lime from the purifiers through which gas has passed, and which will consequently be of a greenish colour. This will improve the quality of the manure as a fertiliser, and quickly free it from worms, large and small. Whether it kills them or drives them away I am unable to say, but at all events they disappear. A similar result may be obtained by well watering the heap with strong lime water, but gas lime, if it can be obtained, is best.

Orange Cultivation in Jaffa.—Oranges are grown on a large scale in the neighbourhood of Jaffa, where it is calculated as many as 400 Orange gardens exist. The irrigation is managed on a very primitive system: each garden has a well to which machines are attached turned by mules; from three to four animals have to be continually at work, day and night, for seven months in the year. The average expense of working and watering an orchard is estimated at about £35 or £40 per annum. It is said that if irrigation could be done cheaper it would have the effect of doubling the number of gardens in a very short time. About 5000 men are employed daily in picking and packing Oranges in boxes for exportation.

The Chrysanthemum in Japan.—The Chrysanthemum, being the emblem of the army of the Mikado, is highly esteemed by the Japanese. Our correspondent, Mr. Kizo Tamari, who is now studying agriculture in the United States, sends us some items drawn from recent information he has received from home. At the time of flowering, the Japanese florists make public exhibitions in their own gardens, where, besides the regularly trained plants, they show the Chrysanthemum made up in various styles of floral decoration. These designs present images of some old story, &c., and are usually made up of small and inferior varieties. The florists show their greatest skill in their regularly trained plants. The people are now allowed to enjoy their favorite flower at Aoyama Castle, of which exhibition recent correspondence gives the minute particulars. The names of a few of the superior varieties are as follows, with the numbers on each plant:—

Nataneno Sato, number of flowers		...	362
Tadsumo Ko	„	...	307
Kuruma Kayeshi	„	...	241
Sanono Watari	„	...	243

A florist at Asakusa made an extraordinary display this year. He exhibited a single plant, ten feet in diameter, which had over 500 flowers, each about one foot in diameter.—*American Agriculturist.*

Aspidistra lurida variegata.—This is an evergreen herbaceous plant that attains a height of 2½ ft.; the leaves are lanceolate in form, stout and persistent, marked longitudinally with broad bands of green and white in about equal proportions; it is easily increased by division of the roots at any time when not in active growth; it will succeed with the simplest treatment in ordinary garden loam. It is one of the best room plants, the foliage remaining in good condition in an ungenial atmosphere longer than most plants; when so used it should be syringed and sponged occasionally to free it from dust.

German Roses.—For some time past there has been a strong movement in Germany to promote the development of a more extended cultivation of Roses, especially the production of a sufficient supply of forced Roses in winter to take the place of importations from France and Italy. Now it is proposed to offer substantial prizes for new Roses of German raising. A large massive gold medal is offered for the best new variety raised in Germany, and a silver one for the second best. It is urged that the English have of late successfully competed with the French in this lucrative branch of gardening, and there is no reason why the Germans should not have their share of the profits.

Avenues of Fruit Trees.—Where, in certain parts of Bohemia, the cultivated fields are hedgeless and the trees all gathered on the hills around, it is a common practice to plant fruit trees on each side of the main roads. Lately Plum trees bordering some of these were laden with fruit which any one passing could easily gather, but the fruit was apparently untouched, and is carefully guarded when ripe where necessary. Such fruit trees do not of course completely shade the road, but they make it a little more endurable during very hot weather. In some cases, but not often, two rows of fruit trees are on each side of the road, and in this case there is more shade, especially for the pedestrian walking between them.

To Force Asparagus.—A method of forcing Asparagus, introduced by M. Jacquisson of Chalons, a well-known horticulturist, consists of an ordinary wine-bottle with the bottom cut off. These bottomless bottles, when well corked, are placed over the Asparagus head just as it is beginning to rise above the ground. The Asparagus, being thus protected, not only grows fast, but is so tender that the whole of it may be eaten. The air being kept from it, the development of the woody fibre of the plant is retarded while that of the cellular tissue is accelerated. Cultivated in this way, Asparagus is as expeditiously cut as when grown in the ordinary manner, sufficient light passing through the bottle to show when the heads are ready for gathering. In addition to this, the small amount of light which passes through the bottle gives the Asparagus a rosy tinge which greatly improves its appearance.

Number of Species.—The total number of flowering plants and Ferns in the tropical regions is very large—perhaps as high as 40,000, or even 50,000, but possibly not more than 30,000. There is an immense amount of work to be done, both in exploring and comparing the vegetation of different districts, before we can arrive at a satisfactory conclusion. Beyond the coast regions almost nothing is known of the flora of tropical Africa, save the fact that large expanses in different parts of the interior are covered with a luxuriant vegetation. Recent explorations in Borneo have resulted in a rich booty of new species; and the number of forms in South America seems literally inexhaustible. Every successive traveller adds to the number previously collected, and years must elapse before the country can be thoroughly botanised.—*W. B. Hemsley.*

American Florists and the Flower Trade.—At a recent gathering of American florists at Cincinnati, the president, Mr. John Thorpe (formerly of Stratford-on-Avon) is reported to have stated that 24,000,000 cut Roses were sold last year; Carnation flowers, he thought, would reach 125,000,000; 200,000 dollars represent about the amount paid the Dutch last year for Hyacinths and Tulips; 700 people are supposed to be engaged in selling

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florists' supplies, and there are probably 2000 cut flower sellers. Florists have grown four-fold in ten years. Catalogues have increased five-fold; these make trade for those who do not catalogue.

Florists are the most generous of human beings. Few people give so much of their ware to public institutions as florists. Still, it was a generosity that paid by the increase of floral taste. There were 2000 first-class gardeners in the United States, and thousands of amateurs without professional help.—*Gardening World.*

A Good Time Coming—Consumers and the better class of growers have long laboured to have fruits sold on some honest plan, by which uniform quality and correct measure could be insisted on in the fruit package. The Common Council of Chicago have just passed a wise ordinance, so that the honest growers and the dishonest commission men, if indeed there be any of the latter, may in the one case be protected and in the other be punished. The dishonest dealer will no longer be allowed to sell pints for quarts, nor honest-looking boxes at top filled as to the interior and bottom with fruit rotten or inferior to that at the surface; no longer may gnarled and wormy Apples, with a veneering of sound fruit on top, be palmed off upon the unsuspecting purchaser as sound to the core; Peach baskets containing a fraction of a peck may no more be sold there for a bushel to the fruit-loving citizen. The ordinance provides first, that "it shall be unlawful for any person to sell or offer for sale fruits or berries within the City of Chicago except by the barrel, bushel, or some aliquot part of a bushel, according to the table of dry measures, nor shall it be lawful to sell fruit or berries in packages, except every such package contains a barrel, a bushel, or some aliquot part of a bushel, according to the table of dry measures; and, in the second place, that all fruits or berries, fresh or dried, sold or offered for sale in the City of Chicago in packages, shall be of equal goodness in every part of the package."—*Prairie Farmer.*

How to teach Horticulture.—"What has he done?" was the criterion of the great Napoleon when the merits of a great unknown general were laid before him. When much theory is being talked and written about the higher forestry teaching, it may be interesting to know what Professor Lazenby, of the State University, Ohio, has done in the Horticultural Department of which he is in charge. Observation and practice are required to supplement and emphasize the instruction of the class-room.

The following is a brief summary of the means of illustration and instruction at the disposal of students:—

1. A museum, containing specimens of nearly every plant found in the State, and fairly representing the flora of the United States. A large collection of grasses, seeds of weeds and various economic products of the vegetable kingdom.
2. An orchard, containing numerous well-selected varieties of the apple, pear, cherry, plum, and quince.
3. A garden of small fruits, containing nearly all the good varieties of the strawberry, raspberry, blackberry, currant, and gooseberry.
4. A vegetable garden, with hot-beds, cold frames, experiment plots, conveniences for irrigation, etc.
5. Nursery and forest tree-plantation, with practice rows, budding, grafting, pruning, etc.
6. Ornamental grounds, planted with a large variety of evergreens and deciduous trees and shrubs.
7. A well-built and conveniently-arranged green-house, furnished with a good collection of native and exotic plants.

In America, compact teaching power seems preferred to that vague grasp after the unapproachably magnificent so well known in British Universities.—*Journal of Forestry.*

The Bamboo.—The Bamboo in the Chittagong Hill Tracts is literally the staff of life of the Hill man. He builds his house of the bamboo; he fertilizes his fields with its ashes; of its stems he makes vessels in which to carry water; with two bits of bamboo he can produce fire; its young and succulent shoots provide a dainty dinner dish; and he weaves his sleeping mat of fine slips thereof. The instruments with which his women weave their cotton are of bamboo. He makes drinking cups of it, and his head at night rests on a bamboo pillow; his forts are built of it; he catches fish, makes baskets and stools, and thatches his house with the help of the bamboo. He smokes from a pipe of bamboo; and from bamboo ashes he obtains potash. Finally his funeral pile is lighted with bamboo. The hill man would die without the bamboo, and the thing he finds hardest of credence is that in other countries the bamboo does not grow, and that men live in ignorance of it. Throughout the whole of India, indeed, the bamboo occupies a forward place in the domestic economy of the inhabitants. It remained only that it should be deified; and this, it seems, has been done. In Dr. Balfour's account of the migratory tribes of Central India (J. A. S. No. 61 of 1844) he tells of a tribe called the Bhatos, a tribe who follow the profession of athletes, and perform most of their feats with the aid of a bamboo.

"Their patron goddess is Korewa, an incarnation of Mahadeva. Her shrine is situated at the village of Trekoor, near Ritwor, around which dense forests of bamboos grow. One they select, and the attendants of the temple consecrate it. It is now called 'Gunnichari' or chief, and receives their worship annually. To it, as to a human chief, all respect is shown; and in cases of marriage, of disputes requiring arbitration, or the occurrence of knotty points demanding consultation, the 'Gunnichari' is erected in the midst of counsellors or arbiters, and all prostrate themselves to it before commencing the discussion of the subject before them." This is certainly the best kind of chief I ever heard of.

In like manner, one of the clans in the Hill Tracts (the Riang Tipperahs) offer worship to the bamboo. They do not however go the length of the Bhatos, in considering it as a chief, for it is to them merely an impersonation or reprepentative of the deity of the forest.—"*Wild Races of South-Eastern India,*" *by Captain T. H. Lewin.*

Original Articles.

PALMS.

(*Continued from page* 210.)

Licuala.

Licuala acutifida.—A very dwarf species, native of the Malay Peninsula, from the stems of which are obtained the "Penang Lawyer" walking canes.

Licuala peltata—A variety with fan-shaped leaves supported on erect petioles two to three feet in length, armed with stout dark spines; the leaves, which are of a very dark green hue, are divided into segments quite down to the point of attachment.

Livistona.

This is undoubtedly the best known genus of this extensive order in this country, L. Mauritiana being one of the most useful plants we possess. This species was introduced into our Calcutta Gardens as far back as 1830 from the Mauritius, hence probably the name it bears, it being undoubtedly of local origin. It is occasionally grown in Europe as *Livistona Chinensis*, but is better known as *Latania Borbonica.*

Livistona Australis.—This plant is more frequently known as *Corypha Australis*, and is one of the most useful and ornamental Palms in cultivation; the leaves are nearly circular, divided round the edge into narrow segments and dark green; the petioles are dark brown in colour and armed at the edges with stout spines.

Livistona Hoogendorpii.—A fine stove Palm, of spreading habit; the leaves, which are nearly three feet broad, are palmately divided, the segments being broad, and giving the leaves a bold and distinctive character. The leaf-stalks are abundantly furnished at the margins with stout sharp spines.

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Livistona Jenkinsiana.—A very beautiful variety, rarely seen in our gardens. The leaves are two to three feet in diameter, of a very dark green, the margins being divided into broad segments, in this respect differing from most other species of the genus.

Livistona Mauritiana.—We have for convenience retained the local name of this species; in Europe it is more generally known as *Latania Borbonica*, also as *Livistona Borbonica* or *Livistona Chinensis.* The leaves are large, fan-shaped, with pendent marginal segments, supported on petioles three to six feet in length, the edges of which are armed with short reflexed spines. Easily raised from seed which is freely produced on old plants.

Livistona rotundifolia.—A very handsome and distinct species, the leaf-blade is perfectly round, giving it a peltate appearance. The petiole is thickly clothed with short, thick, dark brown spines.

Livistona umbraculifera. See Corypha *umbraculifera.*

Martinezia.

Martinezia granatensis.—A desirable new dwarf Palm, from Colombia; the leaves are of a roundish oblong or roundish ovate outline, entire at the base, bifid at the apex, and evenly toothed along the edges, the young leaf-stalks being slightly mealy. Both the petioles and rachis are armed with dark brown needle-shaped spines, varying from half an inch to an inch in length, and which are either spreading or deflexed.

Maximilliana Regia.

A very distinct pinnate Palm; pinnæ long, narrow, pendant, and dark green. It forms a beautiful object for stove and general decoration.

Oreodoxa.

Oreodoxa regia.—A very handsome species that has become quite acclimatized in this country; it is a slender growing and graceful variety. The leaves are pinnate, three to six feet in length; pinnæ eight to twelve inches long and about an inch in breadth.

Oreodoxa granatensis.—A very ornamental pinnate-leaved Palm, introduced from the United States of Colombia. The stem is smooth, and the leaf pinnate, with long narrow leaflets, which are more or less drooping. It is a very elegant plant, and in the young state is admirably adapted for table decoration.

Phœnix.

The members of this genus as a rule resemble too closely our wild date Palm ever to become very popular in Indian gardens, amongst them, however, are one or two very beautiful varieties that are well deserving of attention.

Phœnix reclinata.—A very handsome species from South Africa, quite distinct from any of our Indian forms, the leaves are pinnate; pinnæ linear, somewhat triangular and spreading.

Phœnix rupicola.—This is one of the most graceful amongst the smaller Palms, and in form takes a place among Phœnices similar to that which Cocos Weddelliana takes among the species of Cocos. In habit it is stemless, with wide arching leaves, having a slender midrib. They are broadly lance-shaped in outline, with long narrow pinnæ, the lower of which become gradually reduced to spines. The pinnæ are channelled at the base, and appear to be attached by the folded base which joins on to the winged rachis, the wings being pressed together along the spaces between the pinnæ and continued into the lamina. Some of the lower pinnæ and spines are set on in contiguous pairs.

Pritchardia.

Pritchardia filifera.—This Palm, sometimes known as Brahea filamentosa, is another species that can be strongly recommended. This would not only thrive in the plains, but would also in all probability prove hardy in our hill stations, as it grows farther north than any other of the Palm tribe, its native habitat being the banks of the Colorado, in the province of Arizona, in New Mexico, where it bears the winter frosts without injury. It is excessively graceful in appearance, long white filaments falling from its palmate leaves, giving them the appearance of being furnished with plumes. This variety ought to occupy a conspicuous position, not only in private collections but also in those of public gardens. It will be found to form a good substitute for Latanias, Phœnixes, and similar Palms.

Pritchardia grandis.—This Palm is well named grandis, being undoubtedly one of the noblest fan-leaved Palms of small or medium growth yet introduced. It comes from the South Sea Islands, and consequently will require a high temperature in order to grow it satisfactorily. Its leaves, which are of a deep, shining green, are massive yet elegant in their arrangement on the plant. It would be difficult to imagine a better contrast than this plant makes growing in close proximity to the slender Cocos Weddelliana.

The leaves spread out nearly horizontally from all sides of the stem; they are slightly convex above, and sub-orbicular in their general outline, but truncate at the base, regularly plaited into alternate ridges and depressions at the veins, which diverge gently from the midrib. The margin is divided into angular lobes, each with a small indenture at the apex; the petioles are triangular, with the flat side upwards, the edges of which are furnished with spines. The leaves measure from 12 to 15 inches across at the broadest; the foot stalks are about 3 inches long—dimensions that will unquestionably be greatly exceeded as the plants increase in age.

The extremely elegant contour of the plant, the boldness of the fronds, and their bright grass green colour, at once arrest attention, and mark out this Palm as one of the most striking of the genus ever introduced to cultivation.

Pritchardia pacifica.—This is a most superb Palm from the Pacific Islands. The petioles are clothed with a white scaly tomentum, flat above, rounded below, and totally unarmed. The leaves are large, flabellate, plaited, and of a rich dark green.

Pritchardia pericularum.—A variety of recent introduction that has not yet we believe been introduced into this country.

Pritchardia Vuylstekeana.—A very distinct and handsome new variety of robust habit; leaves large, very deep green and closely set; stem and petioles short and thick. The plant begins to characterize when not more than a foot or a foot and a half high.

Ptychosperma.

Ptychosperma Alexandræ.—An extremely handsome Palm, and from its graceful habit invaluable for table decoration. Leaves pinnate, beautifully arched, bright red in a young state, changing with age to light green, while the under part is of a silvery colour.

Ptychosperma Seemanni.—An elegant dwarf-growing pinnate-leaved Palm, well adapted for table decoration and general decorative purposes. The pinnæ are erose-dentate, somewhat resembling those of a Caryota in appearance, and of a bright green colour. This Palm never attains large dimensions; the stem, when fully developed, is about one inch in diameter, and is used, on account of its strength and straightness, for spears by the Natives of New Guinea, from whence it was received.

Ptychosperma Singaporensis.—Truly a "most elegant" Palm. It has slender stems, and rich green leaves, on smooth green petioles. The leaves are elegantly drooping in habit and ovate in form, consisting of numerous narrow leaflets, tapering to a long slender point.

Ptychosperma Cunninghami. See *Seaforthia elegans.*

Sabal.

Sabal Adansoni.—An old and not very attractive variety; one of the slowest growing Palms with which we are acquainted; the deeply cleft flabelliform leaves, which are deep green above and silvery grey beneath, are borne on erect petioles two to three feet in height.

Sabal Blackburniana, also known as S. umbraculifera, is a very handsome and robust variety; the leaves on fully developed plants being of an immense size. The petioles are sheathing, perfectly smooth; the leaf blade is flabellate, plaited and divided at the margins into narrow pendent segments.

Sabal cærulescens.—A remarkably bold and handsome Palm introduced from the United States of Colombia. The leaves are palmately divided, the segments broad, with a plicate surface, and

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having a bluish or glaucous tinge of green, which is very strongly marked on the under surface.

SEAFORTHIA.

Seaforthia elegans.—This species although introduced into this country as far back as 1839, is rarely met with in our gardens. It is one of the most beautiful Palms where there is room for it. It requires space and generous treatment, and then few things can come up to the graceful beauty of a large plant of it, with the older fronds bending down in a fine curve and the new fronds pushing straight up from the centre. This is the Palm generally used in Europe on Palm Sunday, being tied up in an ornamental fashion by the natives of Madeira and along the coast of the Mediterranean for that purpose.

Seaforthia Robusta. See *Areca Baueri.*

THRINAX.

Thrinax Barbadensis.—This is a very elegant and neat-growing Fan Palm. The petiole terminates in a digitately multipartite blade, the numerous segments of which are of a stoutish texture, three-nerved, and of a lively green colour. It is, as its name implies, a native of the Island of Barbadoes.

Thrinax elegans.—This is a most beautiful species, producing its large very finely divided fan-shaped leaves upon long slender petioles, which are tinged with yellow. It is very robust in constitution, and consequently is well adapted for general purposes of decoration.

Thrinax elegantissima.—An exceedingly elegant and graceful species, in habit somewhat resembling the preceding, but is of much smaller growth.

Thrinax parviflora.—A dwarf variety of great merit; the petioles are slender, twenty-four to thirty inches in length; the leaf blades, which are about two feet in diameter, are divided about half way down into narrow segments, bright green in colour.

VERSCHAFFELTIA.

Verschaffeltia splendida.—We do not give the synonyms of this Palm, as they are numerous, and it is best known by the above name. There is no mistaking it, as it is so distinct in appearance. It has a slender stem, which is raised on a mass of large roots. The petioles are stout and clasping the stem, the whole being armed with reddish spines; the blade of the leaf is nearly as broad as long, cleft at the top, with several short divisions round the margins. It is invaluable for decorative purposes, having a majestic appearance. It is a native of the Seychelles, and probably will never be very plentiful, but it is extremely effective in whatever position it is found.

BULB GARDENING IN INDIA.

There is no questioning the fact that the culture of bulbous plants generally has been sadly neglected in this country. Amateur gardeners seem to entertain a belief that it is almost impossible to succeed with them in the plains; how, or when this idea originated it is difficult to say, as each succeeding generation of writers on Indian horticulture have almost invariably adopted it; even Firminger, for whose opinion on horticultural matters generally we have the profoundest respect, on this subject falls into the common error of condemning a vast number of genus, and especially those belonging to the tribes Amaryllidaceæ and Liliaceæ. True Firminger's work was written nearly fifteen years since, and during that period not only has there been a vast number of new introductions, but an immense improvement has been effected amongst older species and also in the treatment accorded them. We have persistently advocated the more extended culture of bulbs in this country, and several of our correspondents have given much valuable information on the subject in our columns, and we trust the time is not far distant when this interesting and instructive branch of horticulture will receive the attention it deserves. The following interesting communication recently appeared in the *Pioneer*, and is evidently written by one who is *con amore* with the subject, and we feel assured it will prove interesting to any who have already turned their attention to this matter.

"Being an enthusiastic admirer of all flowers, and especially of bulbous varieties, and having devoted several years in experimenting on their growth and treatment in England, I have great pleasure in endeavouring to answer the questions on the "growth of lilies, &c., in the Panjab" in your paper of April 14. I am only a visitor to India, but am much struck with the barren and unkempt appearance of almost every compound, when, with so little attention and expense, I believe, they might be made permanently beautiful, and in no way more so than by a plentiful supply of bulbs. These, if judiciously selected, are extremely cheap, the expense of purchasing and planting being almost the only one, as their after-treatment is so simple, and little or no labour required except for watering. I should think it would be a mistake to purchase many of the lily bulbs in England, as the greater number of varieties come from either China, Japan or California, and that it would be both easier and cheaper to get them direct through an agent from these countries; besides which the bulbs would arrive here in a shorter time, and consequently be a less number of days out of the ground before being replanted, and this is a point of considerable importance. There are few more strikingly beautiful objects in nature than a clump of, say, 9 bulbs of Lilium Auratum in full bloom, each spike having from 6 to 16 or more fully expanded flowers. The methods of planting and growing them on should, I think, be as follows:—

First, in pots.—Be sure the pots are porous and clean; put plenty of drainage at the bottom and minutely examine the soil to see that it is free from all insect life. Plant carefully and cover the crown of the bulb with about half an inch of soil, entirely surrounding it with a handful of coarse sand; a light sandy loam soil being the most suitable. After potting place them in complete shade, and keep the soil nearly dry (but on no account dust dry) till the bloom spike is well above the earth; then gradually increase the quantity of water and expose to more light, but on no account to the full blaze of a tropical sun, as this shortens the life of the individual flowers: give the bulbs a good mulching of an inch or two of dried cowdung and soil mixed, and keep watering till not only have the blooms faded, but also the flower stems stopped throwing up any sap, then gradually decreasing the quantity of water until all growth is dead, when the bulbs may be shaken out and repotted, great care being taken not to injure any of the roots that show the smallest sign of life. Many excellent gardeners advocate repotting just as the flower spike appears above the earth, but from practice I have found they are more liable to injury at this time, as the roots are then covered with a small new fibrous growth that is certain to be injured in the potting.

Secondly, in the open ground.—I have little doubt if the soil be of the ordinary light sandy loam, and free from wire worm and other root-devouring insects, that Lilies in general would not only live, but that they would multiply and increase both in the size of bulbs and blooms. I would here state that it is by no means a rule that the largest bulbs are the best; I place much more reliance on those which are compact, solid and weighty. I should now follow the plan which has succeeded so well with me in England, namely, to dig a hole of the required size to plant in clumps of from 3 to 9 bulbs, and about four feet deep; place nearly a foot of broken crocks or brick rubbish, &c., so as to form a quick and complete drainage; then fill up with the soil and plant the bulbs of Lilium Auratum about nine inches apart and four inches below the surface, surrounding each bulb with a handful of sand. It is an excellent, in fact almost essential plan, to cover the bulbs with a good mulching of old cow manure during the hot weather and growing season, as this both keeps their roots cool and gives them the necessary nourishment. The greater number of bulbous plants require a partial shade, and in the case of lilies or bulbs which throw up tall flower stems, be sure to see they are all properly staked and tied with bast so as to prevent their being snapped off by wind or rain; at the same time see that the bast is tied loose enough to allow for the expansion of the stem. I believe it would also be advisable to give them some kind of protection during the heavy rains. To make a named collection of Lilies

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at a minute's notice, and entirely from memory, so as to suit all tastes, is quite beyond my power, but I will name a very few that will probably give satisfaction both on account of their cheapness and beauty. There are very many others, both larger in size and richer in colors, but as a rule, they are far more expensive. Their names and all particulars concerning them, together with their prices, can be obtained from the bulb catalogues of such reliable firms as Mr. Bull of Chelsea; Messrs. Veitch, Chelsea; Messrs. Barr and Son, King Street, Covent Garden; Mr. B. Williams, Holloway; Messrs. Hooper, Covent Garden; Messrs. Sutton, Reading; Messrs. Cannell of Kent, and many others. My small selection to begin with would include—

Lilium Auratum.
" Krœtzeri (this is a special favourite of mine).
" Tigrinum (both single and double).
" Speciosum Album.
" " Rubrum.
" " Roseum.
" Pomponium, in varieties.

And the common white lily, *(Lilium Candidum)* as well as the beautiful Belladonnas. There are also two pure white, sweet-scented plants, I shall mention in the same group, namely, the Eucharis Amazonica and the Tuberose. Probably there are not any more useful plants than these grown, as no lady's bouquet is complete without the former, and the latter, being small and exquisitely shaped, is useful wherever flowers are required. As to the lily of the valley as spoken of by your correspondent, I have grave doubts about its thriving in the plains; but as he has already got the roots, I think the following treatment would give them a fair chance. Should they be crowns, instead of clumps let them be planted about two inches apart and one inch below the surface. A perfect shaded and cool place is absolutely necessary, but not under trees, as the drippings from these in heavy rains are fatal to nearly every kind of plant. Cover the crowns with two inches of cow mulching, and almost any quantity of water from the time their leaves and flowers show above ground, and keep on the waterings till the leaves have entirely withered. Water alone keeps the leaves fresh and green, and the longer they can be kept, the larger will become the crown and the next season's flowers. Always remember that it is the course of treatment by the gardener at the time of and *after* flowering that ensures next year's success, or otherwise; and if a bulb is neglected after it has flowered, it is sure to give only disappointment the following season. Bulbous species are so numerous that it would be almost impossible from memory alone to make anything like a complete selection, but amongst them I should like to name the beautiful Scillas, especially Scilla Siberica, also the Daffodils, Tulips, Tulipas, Gladiolii, Gloxinias, Caladiums, Amaryllis, Valottas, Achimines and Colchicums, &c. The Hyacinth is well known, but only flowers well the first season. Although not properly belonging to bulbous species, I should like to name Begonias and Dahlias; some of the new cactus tribe of the latter are very striking. As I am only a stranger in India, it is probable I am mistaken on many points; and if so, should feel very grateful for any corrections. I particularly wish to explain that in advocating the planting of bulbs, I do not in any way wish to depreciate the great value and beauty of trees, shrubs, roses and herbaceous plants, or of the numerous annuals which alone will keep a garden bright and gay almost the whole year round. My great love for flowers, and wish to see them more universally grown, must be my apology for the length of this letter.

AUBREY L. PATTON.

DOUBLE ZINNIAS.

Those who have never grown these, or seen them in masses, can have no idea of the grand display they make, or of the great service they are for filling large beds, especially at a season when but few annuals can be induced to bloom at all, and where if mixed judiciously, so as to blend the various colours, they produce a most striking effect, and are perfectly dazzling to look upon. Unlike Balsams that get much injured by heavy rains, Zinnias are all the brighter and better for the washing, their stiff stems being sufficiently strong to hold the flowers erect; and as the petals are thick, and throw off water readily, wet does them no harm. Not only are they grand in beds but they form fine groups in borders, arranged in patches of three placed triangularly about nine inches apart; grown in this way it is best to have each batch of the same colour, so as to appear as one plant. Being rather gross feeders and fond of good soil, the situations chosen for them should be specially prepared by breaking the ground well up and digging into it some thoroughly rotten manure, keeping the same down that it may be buried out of the reach of the tender roots for a time, till they become more active in response to a corresponding movement taking place in the tops. When we first took up the culture of Zinnias, we found they suffered much by being raised too soon. We never sow the seed now till the end of May or beginning of June, which is quite early enough, as the plants are very tender, and are sure to become stunted if planted out before the rains set in, or, what is quite as bad or worse, if kept too long in the seed pans they get drawn and have attenuated shoots too feeble to stand. To prevent this, the best way is to sow very thinly in the boxes or pans, which, as soon as the young plants are up, must be kept in a position where they will have plenty of light, for during the early stages the stems elongate at a great rate, especially if there is a deficiency of air or too much heat at the time, which often happens if the boxes are not at once removed from the positions they are first placed in to induce the seed to germinate. To afford them plenty of room the rows ought not to be nearer than twelve or fifteen inches, and the plants should have the same distance allowed from each other, as then they branch freely and continue to flower profusely for a much longer period than when more closely crowded together. As they are fond of heat and dislike shade, it is important that the site selected should be a sunny one, and if sheltered from wind, so much the better, for when exposed the weight of their heads renders them liable to be knocked about by its force.

ASPIDISTRAS.

These were formerly placed in the Arum family: they are, however, undoubtedly Liliaceous plants. From the elasticity of their constitution, they have long been favourites, especially in France, for the decoration of apartments. Keep them fairly watered, sponge the leaves now and then, and there is scarcely a limit to their endurance, even under such conditions as would totally fail to keep life in very many of our common hardy flowers. The two plants mentioned in these notes furnish excellent examples of species that will thrive well in drawing-room, stove, greenhouse, and in warm spots in the open border. As at present restricted by Mr. Baker, the genus Aspidistra contains but one species, A. lurida, a native of China, the Eastern Himalayas, and Khasia. A. punctata of Lindley is synonymous with this. The plant known so long under the name of Aspidistra elatior is now removed into the genus Plectogyne, and bears the specific name "variegata." It is indiginous to Japan. Not to mention its intrinsic merits, very much interest attaches to it in consequence of the extreme peculiarity in the structure of the flower. The beautiful, smooth, glossy, striated, stalked leaves spring from thick, creeping rhizomes, and the flowers are borne singly on very short peduncles. So short are the flower-stalks that the flowers are often more than half buried in the soil. The bell-shaped perianth is of a dull purple colour, eight-cleft. The style is thick, and expands into a large discoid eight-rayed stigma that closes up the top of the tube as completely as the lid of a box. How fertilization is effected, many observers have been much puzzled to know. The eight stamens are inside the box, whose walls are dusted all over with pollen: but how this pollen finds its way to the stigma is the question. If the stigmatic plate be held upside down, four little holes are visible, and according to Delpino's conjecture, minute insects crawl through these into the pollen-dusted box beneath, and emerge with pollen adhering to their bodies. They then fly to another flower, over and about the stigmatic rays of which they

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wander some time before finding another entrance. Be that as it may, fertilization very rarely takes place. Indeed, in Mr. Baker's revision of the genus in the "Journal of the Linnean Society" it is stated :—"Although the plant is not uncommon in our greenhouses, I am not aware that it ever produces fruit."—*The Garden.*

SEASONABLE NOTES.

Roses.—Tea Roses in Pots that have been flowering for some time will, if strong, yet keep on making wood that will yield flowers, but to have them of good size and sufficient quantity the plants must be regularly and liberally fed with rich surface dressings. Where any falling off occurs in this matter the after growth will come too weak to flower, or if a portion of it does bloom, the produce will be thin and poor. It rarely happens that pot Tea Roses yield nearly the quantity of flowers of which they are capable, through want of liberal feeding. The nature of these Roses is to keep on all but continuously growing, and unless they receive a regular and liberal supply of manure in either a solid or liquid form, they neither increase in strength nor produce flowers in abundance. They require and will bear much more in the way of stimulant than is generally supposed, and so applied they have a much better effect than any quantity of solid matter added to the soil at the time of potting. When the plants are turned out in beds, and their roots have thus unrestricted space in which to extend, they naturally are better able to take care of themselves, but even then a free use of manure water will be found advantageous; whether grown in pots or planted out, copious supplies of water must be given, not merely sprinkled in the way often thought sufficient, but letting them have it without stint both to root and foliage.

Plants in Small Pots.—For the purposes of ordinary cultivation it is a mistake to use larger pots than can be made to suffice either for flowering plants or for those that are grown for their effective foliage. In the case of the former, where too much root room is allowed, it induces over-extension of the shoots and foliage and often a straggling condition collectively, without a proportionate increase in the quantity of flowers. Where larger pots are used for fine-leaved subjects than needful, their appearance is neither so attractive, nor are they so enduring, as gross over luxuriant foliage soon loses its bright healthy look. In addition to these objections where plants are so treated as to induce extraordinary development, there is necessarily less room for variety, consequently in the potting operations that take place at this season it is well to give no more root space than is requisite, trusting to the aid of surface manuring or liquid stimulants to keep the plants in a robust healthy state. This particularly applies to such plants as are wholly or partially shaken out, and which have their soil renewed annually. Where plants are wanted for special purposes, and size is an object, this course may be departed from, especially when grown in a light airy position, conditions which directly check extension of top growth.

Eucharis.—Easy as Eucharises are to manage, many fail with them through an inability to keep their leaves in a healthy state. The most frequent cause of this is allowing them to be too much exposed to the sun, to which, unlike most other cultivated bulbs, they have the greatest dislike. Plenty of root room is essential to quick growth and free flowering, and if small specimens are deemed the most desirable, they should be divided, and the bulbs placed three or four together, instead of letting them remain crowded. If by any chance the plants are strong, and do not flower so freely as they ought to do, the shaking out and separation needful for their being put in small pots is almost sure to have the effect of throwing them into bloom.

Ferns.—Any plants that were not potted early in the season should now receive attention, providing good drainage and soil that will admit of the water passing freely through it. Plants with creeping rhizomes, as Davallias, Gleichenas, &c., should never be allowed to suffer from having their stems injured, as they will if they are allowed to extend over the rims of the pots. Ferns must never be allowed to suffer from insufficient supplies of water, as, if ever the young fronds droop or flag from want of moisture, they become stunted, never attaining their proper size.

Marantas.—These should now be starting freely into growth, and must be repotted in a rich loose vegetable soil, consisting principally of well rotted leaf mould, good fibrous loam and a very little decayed manure and sand. Pot moderately loose in well drained pots, which should be of rather large size to give them plenty of root room. Marantas are shade-loving plants, and must therefore not be placed where the sun shines fully on them.

Alocasias.—These also delight in shade and plenty of moisture, and where these conditions are secured there is little difficulty in cultivating them with success. Young plants of A. metallica, A. Lowi, and others of that type, must be kept well above the rim of the pot when shifting them into others of larger size, which operation should be performed at once if it be desired to grow them on as quickly as possible. Well drain by the use of plenty of crocks and use a compost of good light leaf mould, chopped moss or cocoanut fibre and coarse charcoal. In potting take care not to injure the large fleshy roots protruding through the old ball. Alocasias of the macrorhiza variegata type require different treatment as to soil, good fibrous loam, used in a rough state, being the most suitable. This, like the others, requires plenty of water when growing, and must therefore be well-drained. This variety has unfortunately a tendency to revert to the green form and lose its variegation, therefore in making the requisite divisions for potting only those showing the best marked leaves should be retained for growing on.

Allamandas.—Where these have made very long straggling growth without showing flowers, they may have their points nipped out : the shoots should then be trained regularly over a trellis, bringing the points low down. This will cause a quantity of the back eyes to break that in due time will show bloom. See that the plants are liberally supplied with manure water at intervals of about a week.

Chrysanthemums.—Those still in cutting pots should at once be potted off singly into small pots, and returned to a cool, shady position, and care must be taken that they are shifted again into larger pots before becoming root-bound. Do not pinch out the head at this stage unless bushy-plants are required, as standards are the easiest grown and give the best results. It is not yet too late to strike cuttings for this mode of culture.

Campsidium, or Cupania filicifolia, is a very elegant habited plant, having beautiful fern-like foliage, borne on light fragile stems that give it a very graceful and pleasing appearance. This is well adapted for table-decoration, and especially for baskets or cut sprays for epergnes or tall vases of flowers to hang down over the sides, in which position it is very effective. Old plants cut back now will soon start again, when the tender growth should be taken off with a heel and struck in sand under a bell-glass. One or two planted out where they can have room to spread will afford abundant supplies for cutting,—a purpose for which it should be highly prized.

General Work.—Careful attention is requisite to preserve Fine Foliage Plants in good condition at this season, frequent sponging is of great importance, and as this requires much time, advantage should be taken of any cessation of work in the open air during rain to do as much of it as possible. Woodlice, slugs and snails are also great pests among foliage plants, and as they are invariably busiest at night, it is an excellent custom to walk through the houses as late as possible to catch and destroy every one of the marauders that can be found.

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Correspondence.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be repelled to should be sent in not latter than the Friday previous to the day of publication. All communications should be written in one side of the paper only. It is also requested that correspondents forward their name and address not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

III.—THE SILVER TREE.

Formerly it was supposed that the Silver Tree—known to botanists as *Leucadendron argentum*, and whose leaves are now so much used for decorative purposes—was restricted to the Table Mountain; but recent explorations have led to its discovery in several localities in the Drakensteenberg, lying from 50 to 60 miles distant; still there is not the same certainty that the Silver Tree is really indigenous in these localities, as there is that the glory of the Table Mountain, *Disa grandiflora*, which also was believed to be peculiar to the Table Mountain, is so in the Cedar Mountains in the Clanwilliam District, much farther way.

The Silver Tree is in every way such a distinct tree, so different in aspect from all its congeners, and so striking an object in the limited district where it is at all common, that any new particulars concerning it are generally interesting.

Dr. R. Marloth contributes an article on this subject to the current part of Engler's *Botanische Jahrbücher*, in which he briefly sketches the history and distribution of this remarkable tree, which, it may be mentioned in passing, is well illustrated in the North Gallery at Kew. It appears that it has been observed by Mr. H. Bolers, the most accomplished of South African amateur botanists, on the Heldenberg, by Dr. P. D. Hahn on the Schaapenberg, and by the Rev. Mr. Faure on Simonsberg. Discussing the probabilities of the Silver Tree being indigenous or planted in these localities, which lie some miles apart, Dr. Marloth thinks they favour the assumption that the former is the case. Certainly they have not been planted within a considerable period, for nobody in the neighbourhood of those places knows anything about them. That they were planted in earlier times during the Dutch occupation he holds to be very unlikely, because planting was then limited to avenues of European Oaks and a few groves of Pines. He also urges that the intervening sandy plain of some 20 miles in breadth is a sufficient obstacle to have prevented modern migration. Of course no opinion, worthy of consideration, could be hazarded on the foregoing points without a complete knowledge of the early history of the settlement of the country and a thorough acquaintance with its topography; but we have the testimony of the accurate and observant Burchell that the Silver Tree was planted to some considerable extent as long, or longer ago, than the beginning of the present century. In his Travels (vol. I, page 61) is the following passage relating thereto, premising that it was in the year 1811 :—" Neither of us being acquainted with the proper road to Constantia, we missed it, and wandered till we came to a very pretty farmhouse, where, on enquiring our way of two women, we received an answer in good English. They informed us that the place belonged to Mr. Duckett, an English agriculturist, who has for many years resided in the colony, and whose knowledge of European husbandry has enabled him to manage a Cape farm with considerable success; he is one of the small number of English colonists who were at this time to be met with in the country. This place is called Whiteboom, a name which, with great propriety, it has received on account of numerous plantations of large Whiteboom, or Silver Trees, which grow about it. The native station of this handsome tree is the sloping ground at the foot of the eastern side of the Table Mountain; and at present very large plantations occupy the same situation on the northern side, next to the town. That this space should be the only part in all the colony where it grows wild can be no subject of wonder to any person who has the least knowledge of Cape botany since the natural places of growth of a multitude of other plants are circumscribed by limits equally contracted."

Here then is irrefragable evidence that the Silver Tree was extensively planted long ago in the Peninsula, if not elsewhere. From his route map it would appear that Burchell just missed the localities in the Drakensteenberg cited above, therefore, although he is silent on the subject, the Silver Tree may have existed there in those days. Yet it is surprising that it should have been so long overlooked or disregarded in so accessible a part of the country.

With regard to natural means of dispersion, the Silver Tree exhibits a very singular adaptation of the withered perianth, which doubtless assists in conveying the seeds short distances, at all events. Miss North's painting shows some plumed bodies floating away from the opened cones, which puzzled us much until we had examined herbarium specimens, and ascertained what they were. The strongly bearded or plumose, four-lobed, finally scarious perianth breaks away from the light one-sided nut, the lobes still adhering by their tips, and forming an orifice through which the persistent capitall style does not slip.

When the fruit is quite ripe and the weather dry and sunny the four lobes of the perianth spread outwards from below, and the winds carry them away, bearing the seed vessel hanging by the tip of the style; the withered perianth thus forming, as Dr. Marloth observes, an admirable breakfall. Such a contrivance or provision is unique so far as we know, but of course much remains to be learnt in this direction.

In habit of growth the Silver Tree bears some resemblance to a stout Pine or Araucaria, and the cone-like aggregation of the seed vessels adds to the likeness. It is, however, of comparatively small stature, not exceeding 40 feet in height, even in the most favourable situations. The male and female flowers of all the species of Leucadendron, and the allied South African genus, Aulax, are borne on different plants, and in consequence of the cones being persistent the females are readily distinguished from the males. This is very striking in Leucadendron platyspermum, an expanse of which is represented in one of Miss North's paintings.

The silvery, soft, downy leaves of the Silver Tree are crowded, and lie almost flat on the branches, like slates on a roof, each partly covering several others. This down is so dense that it is easy to write or paint upon it when the leaves have been dried; and leaves thus manipulated are among the first curiosities sent home by Europeans arriving at the Cape.—W. B. H. in *Gardener's Chronicle*.

A COCHINEAL HACIENDA IN GUATEMALA.

Cattle ranches, sheep ranches, even chicken ranches, are common enough in the United States, but a bug ranch is indeed a curiosity! In this queer country the raising of hemipterous insects of the bark-louse family, notably the *Coccus Cacti* or Spanish cochinilla, is a profitable, if not a pleasant industry. In this portion of Guatemala vast plantations are devoted to the cultivation of the "Indian Fig," or Nopal, a Cactus, *Opuntia cochinillifera*, especially for the nourishment of bark-lice. Between the altitudes of 3,000 and 5,000 feet is the favorite locality for cochineal raising, particularly in the vicinity of Guatemala la Antigua, the ancient capital.

The cochineal hacienda, which we were invited to visit, is the property of Senor Don Felipe Ortiz de Espanosa, and lies about six miles from the city of Quezaltenango. The Espanosa family reside during half the year upon it, in the midst of unnumbered millions of bugs. Happily the insects are not migratory in their habits, but cling with remarkable pertinacity to their Indian Figs, or otherwise a residence among them might be the reverse of agreeable.

The hacienda is walled and bastioned like the domain of a baron of old, with corner towers and loop holes for guns, and shows indubitable trace of having withstood many a revolutionary siege. Upon arriving—accompanied

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by a pleasant party of Castellanos from the city, and escorted by the genial proprietor—we galloped, according to universal custom, through the one front door of the casa, directly into its inner court, where, amid an indescribable conglomeration of dogs, pigs, goats, burros, and other domestic animals, our horses were given to the care of the servants, and ourselves warmly welcomed by the Senora de Espanosa and her bevy of dark-eyed daughters. Being only nine o'clock in the morning, it was, of course, too early by some hours for breakfast; but, under the blossoming Lime trees of the garden, coffee was immediately served, accompanied with *pan dulce* (small loaves of sweetened bread), goat's milk, cheese and pomegranates—all of which delicacies, you may be sure, disappeared in a twinkling before American appetites, "sharp set" by a six-mile morning canter!

Breakfast was served at the usual hour (about one o'clock P. M.), consisting of a dozen elegant courses, with excellent Spanish wines and all imaginable fruits and salads, supplemented with cigarettes for both ladies and gentlemen, and strong, black coffee. At five o'clock came the inevitable chocolate with more *pan dulce*, cheese and wild honey. Dinner we could not remain for, though pressed to do so, as that meal is never partaken earlier than seven in the evening, and we were obliged to return to the city to meet engagements on the morrow.

The Espanosa plantation of *Opuntia cochinillifera* includes 1,000 acres, and the modus operandi of cultivating the insects is most curious. They require about the same care that is ordinarily bestowed upon silk-worms, and probably the occupation is not more loathsome of caring for crawling and wriggling creatures. During the last days of May, immediately before the annual rains begin, great branches of Opuntia covered with insects are cut off and stored in a building erected for that purpose, to protect them from the weather. At the close of the wet season (about the middle of October), the plantations are restocked from these supplies by suspending little nests—made of henequin, jute, maguey, or any other soft, woody fiber—upon the spines of the growing Nopal, each nest containing a dozen female insects. Warmed by the tropical sun, they soon emerge from their semi-comatose condition and begin to lay eggs with marvellous rapidity, each female producing more than 1,000 young. The new crop spreads over the plants immediately, the females at once swelling to surprising size, and attaching themselves closely to the Nopal as to become almost a part of it—resembling vegetable excrescences rather than animate insects. In this condition they are gathered for cochineal, none but the pregnant females being valuable for commercial purposes. The males are comparatively few in number, not more than one male to 150 females, and are of no use for coloring material; the females are picked off with a blunt knife and killed by dipping in boiling water, or baking them in heated rooms or on plates of hot iron. It requires not less than 70,000 of them to weigh a pound.

Occasionally a bug distemper breaks out and devastates entire plantations—as in Guatemala a few years ago, when the *haciendados* were obliged to clear out the old stock, root and branch, and begin anew. The coccus are also fed upon by birds, mice and the larvæ of other insects—the last-named destroyers sucking out the body and leaving only the empty skins.

The high price of cochineal has led to the substitution of other articles for dyeing, lac, madder and aniline having superseded the coccus to a great extent. Various articles are used in the adulteration of cochineal, and "the tricks of the trade" rival the Yankee pine ham, sawdust ginger and wooden-nutmeg industry. Powdered talc, or carbonate of lead, tied in a bag and shaken with the insects, adheres to their wrinkled bodies and greatly increases their weight. Grains of a substance prepared from clay or colored dough, have been manufactured by enterprising Frenchmen to precisely imitate coccus, and palmed off upon an unsuspecting public. Millions of pounds of candy and bonbons are annually colored with these powdered insects—a not very appetizing thought when the facts are considered!—*Fannie B. Ward* in the "*Times*."

FISH MANURES.

It was little more than forty years ago that the first importation of Peruvian guano occurred in Scotland. Those who remember that event will also remember how great was the interest it excited amongst agriculturists, how surprised and delighted farmers were to find that a cwt. of that substance was more effective than a hundred times as much farmyard manure. The price was only about £7 per ton, the quality was excellent, and the supply was considered to be almost inexhaustible. It came at a time when farmers required some encouragement, and marked the beginning of a tide of agricultural prosperity. Peruvian guano, as imported forty years ago, and for twenty years there-after, was a very nitrogenous and somewhat soluble manure, capable of yielding from 10 to 15 per cent. of ammonia, and as much as 10 per cent. of soluble phosphate, so that when put on the land it was an immediate and powerful fertiliser. About twenty years ago the imports of Peruvian guano attained their maximum, and they have since gradually dwindled away—the rich deposits of guano are now exhausted, and there remain only poor deposits, which in great measure will not repay the cost of importing. The supplies which still come dropping in are of a different kind from those of former times—they are capable of yielding little more than 5 per cent. of ammonia, and although they are far richer in phosphates, yet these, as well as the nitrogenous matter, are of a much less soluble kind than formerly.

To find something that will take the place of a high-class Peruvian guano is, of course, a great desideratum, and it has been claimed for fish and flesh manures that they are the modern representatives of Peruvian guano, and the name "guano" has, therefore, been applied to them. Their composition, so far as total phosphates and nitrogenous matters are concerned, lends some support to that opinion, but the resemblance is only a superficial one. The composition of Peruvian guano was a very complicated one, and the constituents were of a delicately-balanced kind, capable of easy decomposition in the soil, and the effect of these upon the crop was very rapid and precise. A large proportion of the phosphates were alkaline, and, therefore, immediately soluble, while the nitrogenous matter consisted chiefly of ammonia salts or complex soluble substances which were rapidly converted into ammonia salts or nitrates, and were thus made immediately available for the nourishment of plants. "Fish guano," on the other hand, and flesh manures such as "Frey-Bentos guano," consist of phosphates which are insoluble in water, and of nitrogenous matters of an albuminoid kind, which are only slowly decomposed in the soil. Before these constituents can be used by the plant, they must first be dissolved or decomposed, and that is a process which takes some time. The insolubility of these manures renders them unsuitable for application in circumstances where Peruvian guano exerted a powerful influence, such as in the forcing away of cereals or young grass when applied as a top-dressing.

These substances are chiefly valuable for broad-cast manuring with the view of raising the general fertility of the soil, or for application to root crops which have a prolonged period of growth. The utility of fish guano in these respects has been very clearly demonstrated at the experimental stations of the Highland and Agricultural Society. The fish guano plot has gone on steadily improving since the beginning of the experiments, and it has been noticed that the Turnip crops on that plot have looked fresh and continued their growth far on in the season. The only year in which a marked deficiency in that plot was manifest was in 1884, at the Pumpherston station, when a crop of Beans was grown. The very backward state of that plot on that occasion pointed out very clearly wherein lies the chief deficiency of fish manure. The results obtained with the Bean crop exceeded in interest any that had occurred before upon the station, and the one over-ruling constituent in a Bean manure was shown to be potash. All the plots that had potash applied to them did well, and those that had the largest dose of potash did best, while those that had no potash applied to them were a failure. The most notable failure was seen in two plots which had been manured with fish guano and fish meal.

It is characterisic of fish manures, that while they contain much phosphate and abundance of nitrogenous matter, they contain almost no potash. But it is well known that the abundance of some fertilising constituents in a manure counts for nothing in the raising of a crop if one of the essential constituents of plant food is absent, or if the one which the crop requires most is present in insufficient amount. We therefore found that the plots manured with fish manures produced a smaller crop than any other plot save one, and that was the plot to which no potash had been applied since the beginning of the experiments.

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We thus see that there have been two causes at work to lower the value of fish manures in the estimation of the farmer; in the first place, he has been led to expect, from the misleading name under which it had been sold, that it would be a manure resembling in its efficacy Peruvian guano, with whose extraordinary fertilising power he had been familiar; and, secondly, the almost total want of potash, which though not abundant in Peruvian guano, was nevertheless present in that manure to the extent of about 3 per cent.

What, then, is needed in order to make fish manures once more attractive to the farmer? They should be sold under a name that does not raise false expectations, and they should have *potash salts* added to them.—*Dr. A. P. Aitken, in "The North British Agriculturist."*

HOW TO TRIM OR PRUNE.

It is impossible to adopt any strict rule for guidance in trimming one's trees properly. The knife must be directed by a knowledge of the habits and requirements of the individual tree in hand.

When a tree is young, a straight leading shoot should always be encouraged, which in the majority of cases, will prevent storms from splitting the tree. The pruning of side branches at the commencement, must be so managed that little will be needed when the tree becomes old. This may in a measure be accomplished by never permitting the shoots to grow too closely together, nor to overlap. Invariably thin out a crowded head each year, so that in time the main branches may be evenly disposed, and sufficiently apart to admit of light and air.

Opinion as regards high or low heads is contradictory, but the weight of evidence is in favour of those who prefer a somewhat low head. After the trees have arrived at bearing age, we ought to be satisfied with the crop of fruit without desiring to turn our orchards into pasture lots for the benefit of our stock, unless it be solely for the smaller animals.

Stock raising and fruit culture are antagonistic on general principles, and more especially as the former's system of pruning is not laid down in the books, and cannot be recommended by any neat painstaking orchardist. Ordinarily, close pruning in spring incites a stronger growth at once, but cutting in midsummer will often produce the contrary effect. Pruners with a knowledge of this theory, or rather fact, pay special attention to the season as a means of obtaining some desired object. We cannot, as a rule, have a strong growth of wood and full crops of fruit at the same time; one must be at the expense of the other. A very strong-growing tree may receive a partial check by summer-pruning, and thus be induced to form fruit buds for the succeeding season's yield. Whenever it becomes necessary to cut away a large limb, it is advisable to allow a few inches of the stumps to remain on for a year, at the expiration of which time it may be cut off smoothly and evenly to the main body. This generally obviates danger from decaying wood. As a still further precaution from injury, all air should be excluded by the application of a solution of shellac in alcohol, over the entire cut surface. Under such a coating, the new bark quickly forms, and in a short time covers the wound. Always bear in mind that a sharp blade will leave a smooth surface to the wound, and a dull edge roughens the wood fibre and induces premature decay.

Systematic pruning has few followers in this country. The necessity for the expensive methods employed abroad in training fruit trees, is not recognized by us, owing to our dry, warm atmosphere. But occasionally we hear of persons pruning their apple and pear orchards according to an established rule, one of which may be described as follows. Commencing with a two or three year old tree, the body is trimmed to the requisite height, when their branches are allowed to start out from as nearly the same height as possible, and forming equal angles. From 18 to 24 inches higher up, a similar whorl is located, which system is carried out so long as the tree increases in height. The disposition of the secondary branches is not very particular, so that an open head is formed.

Orchards commenced under this system of training 20 years ago, have now the trees perfect in outline; but after all, it is questionable whether so much care and labour pays in the end.—*American Agriculturist.*

THE NEEDLE AND THREAD PLANT.

The *Agave Americana*, or Maguey of the Mexicans, is known as the century plant among our collections, the latter name being given to it from the erroneous idea that it bloomed once in a hundred years, and "with such rapidity as to resemble the explosion of a cannon." The period at which the plant really flowers is owing to the climate and the cultivation to which it is subject. In warm countries 25 years is sufficient to bring the flower to perfection. Mr. Hawkins in his "Transactions of the Horticultural Society" gives an account of the most remarkable instance on record of the flowering of the American aloe. Without manure or protection this plant bloomed in 18 years, having attained a height of 27 feet, and having on it 40 flowering branches, each with 400 blossoms, making sixteen thousand flowers in all; the scape with its panicle of rich yellow blossoms, in appearance like a candelabrum. The vast plains in the interior of Mexico is the home of the Maguey, and the plant, with its thorny leaves, imparts a peculiar character to the Mexican landscape.

The strange form of the plant and the rarity of its blossoms are not the only circumstances which recommend it to our attention. From the leaves, roots and sap are obtained a variety of products. "The natives," says Oberaju in his "Travels in Mexico," "make as many uses of this plant as the South Sea Islanders of the cocoa palm, namely, one hundred. The juice of the sap, which is obtained by making incisions in the trunk, being highly caustic, is used in cleansing wounds. Its more extended use is that of producing a bitter sweetish juice known as aquamiel (honey water), which furnishes to the natives a drink called pulque, and when taken in moderation is innocuous and wholesome. The foliage of the Maguey yields an extract which lathers in water like soap.

The agave holds the place of Asiatic hemp and Egyptian papyrus. Ancient hieroglyphics were inscribed on the leaves, macerated in water and glued together as the bark of paper mulberry. Much attention has been recently paid to the manufacture of paper from the leaves. "The fabrication of this material is destined to be a great industry," says the Catalogue of Mexican Products, owing to the quality and cheapness of the material.

The fibres of the leaves with the thorns at the end are applied to manifold uses. The edges of the leaves are indented; at each indenture is a spine. These spines are frequently so strong as to serve the Indians for nails. A needle and thread is also furnished the natives by the simple process of pounding the leaf so as to soften the pulp, then scraping the latter away, allowing the fibres with thorns attached to remain. These are dried by hanging in the sun a few days, and the Indian woman has her needle, which is smooth, and not liable to rust; her thread to sew her coarse dress made from "petal flax" (a textile fabric of this plant) prepared in the crudest manner, yet stronger than cotton which has gone through many process of manufacture.

A rope is made from the fibre of the Maguey which is used in the mines and for the cordage of ships on the western coast. The poorer classes of Mexico thatch the roofs with the leaves, and these being concave serve as gutters to conduct the water away from the leaves. The Greek meaning of agave is "noble," and it is well named, as it is one of the most valuable gifts which nature has bestowed on these tropical regions of America. The wealth of a Mexican of ten consists in his Maguey plantation.—*Scientific American.*

NEW ROSES.

The vicinity of the city of Lyons in France enjoys one of the most favorable climates for the cultivation of Roses in the world. The seeds ripen completely in the open ground, and furnish therefore the best conditions for the raising of new varieties, for which this locality has long been considered headquarters. Still some excellent varieties have been produced by Lévêque & Margottin near Paris, by George Paul and Wm. Paul near London, and especially by Henry Bennett, the originator of the celebrated Bennett Rose.

After new varieties have been sufficiently tested, and are found worthy of dissemination, they are propagated by budding of dormant buds on the collar of one-year-old seedling briars. They are then cultivated one year

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in the open ground so as to form strong, healthy plants which will stand transportation well and are suitable for immediate planting out or forcing. The following are the best new Roses raised in Lyons to be sent out 1st November, 1885.

TEAS.

Marquise de Vivens (Dubreuil).—Beautifully shaped large buds, very bright, dark Rose, edged yellowish white; outside of the petals white, slightly yellowish; semi-double; only very fine in buds before expanding.

Comtesse de Frigneuse (Guillot).—Very fine shape, medium size, nearly full, free bloomer; very bright, pure yellow.

Souvenir de Helene Lambert (Gonod).—Yellowish pink, center darker, medium size, full.

Souvenir de l'Admiral Courbet (Peponet).—Medium size, nearly full, dark Rose, not very vigorous.

Madame David (Pernet).—Flowers large, nearly full, delicate Rose, sometimes shaded light salmon, edged white; vigorous.

Edward de Biauzat (Levet).—Flowers large, full, fine globular shape, light, vivid pink.

Claudius Levet (Levet).—Flowers large, carmine rose, edged darke, center slightly yellowish; vigorous.

Marguerite Ramet (Levet).—Flowers large, full, fine shade; very fine, vivid rose, center lighter, slightly shaded, light carmine; vigorous, free bloomer.

HYBRID PERPETUALS.

Rosieriste Chauvry (Gonod).—Flowers large, full, fine globular shape, light, bright crimson.

Souvenir de Victor Hugo (Pernet).—Flowers large, nearly full, globular, brilliant light rose; vigorous; free bloomer.

Clara Cochet (Lacharme).—Flowers extra large, fine, globular shape, full; very brilliant, light rose; center darker.

PERPETUAL POLYANTHA.

Floribunda (Dubreuil).—Dwarf; flower size of those of Anne Marie de Montravel, delicate rose, shaded white; very full, large trusses, abundant bloomer, very hardy.

Max. Singer (Lacharme).—Very vigorous; sarmentose like the type; flowers large for the species; size of those of Ile Bourbon Hermosa; bright dark, cherry red or bright, light crimson; very free bloomer.

JEAN SISLEY.

Montplaisir, Lyons, France. *in American Garden.*

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FLORAL DECORATIONS.

ARRANGING CUT FLOWERS.

THE judicious blending of flowers and foliage is one of the most important points to keep in view in connection with the arrangement of cut flowers either in bouquets, vases, or other receptacles. Fern fronds are so generally used in such arrangements that they are thought to be in all cases necessary to ensure successful results; but without questioning their value in many cases, there can be no double that a constant repetition of the same kind of garniture will, in a great measure, neutralize that variety which constitutes the great charm of a bouquet. Many of our best flowers, such as those of Orchids and bulbous plants, must of necessity depend on extraneous aid in the way of foliage, but in most cases it will be found that the leaves belonging to the particular flower used will be found to be the most appropriate and effective garnishing; Roses for instance always look best nestling among their own foliage. A half expanded Rose, with buds and leaf entire, constitute the best of button-hole bouquets; or take a vase and fill it in the same manner, and no amount of fringing could add to its beauty or sweetness. The Lily of the Valley, another universal favorite, is exquisitely pretty when arranged along with its own leaves, but robbed of them it loses more than half its beauty. Violets are scarcely worth the name when culled without their leaves; and numerous other subjects might be enumerated which fail to give satisfaction when gathered without foliage. No doubt the highest perfection of greenery is that which the plants themselves provide; each flower set off by its own leaves is seen to the best advantage. But there are exceptions, and often practical difficulties that often render this impossible, and hence the necessity of using foreign foliage that shall prove at once congruous and agreeable. It is difficult to lay down any definite rules, but skilled decorators can tell at a glance what leaves should or should not go with particular flowers. Nothing sets off cut flowers generally so well as the fronds of both hardy and exotic Ferns, particularly the Adiantums (Maidenhairs) such as A. affine, A. scutum, A. tenerum, or A. Farleyense, but the objection to most of them is their not keeping long in water. Next to Fern fronds we have found Rose leaves or twiglets the most useful and effective of all greenery, and they are so catholic in their affinities and congruities that they will go well with anything. Cissus discolor, Tradescantia Zebrina and some of the Coleuses are likewise frequently employed with good effect. Amongst our hardy shrubs always we have several useful subjects, such as Panax fruticosum, P. laciniatum and P. plumatum. As to size it is a mistake to use foliage too large for the flowers, any needful amount of

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greenery may be given in detail. It is seldom good taste to give it in too large single masses. Fern fronds are often used far too large; and in regard to other leaves it is seldom indeed that the largest are the best. Durability is essential to the foliage or branchlets used with flowers. Few things are more annoying than to see the leaves faded while the flowers are yet fresh and beautiful. A great point is never to use foliage too young, such leaves present a tempting freshness, but they seldom or never last so long as the flowers. Ferns specially grown for decoration should be raised in a lower temperature and a poorer soil than is generally required for them; this enables them to remain fresh four times as long as they otherwise would do. In employing Rose and other foliage only that perfectly manured should be selected.

In arrangements for dinner tables or any decoration to be seen at night, it should be borne in mind that flowers of warm colours should be used, warm colours being any kind of red, pink, orange red or yellow, and any white that is tinged with yellow to the exclusion of the cold colours—blue, purple, lilac and cold whites, these make no effect at night, also that the yellower shades of green show brightest under artificial light. In arranging cut blooms for effect, the thing is to select such as will associate well together, as by so doing a vase may be made to look much more striking with one or two things than with many. A perfect dinner table decoration may be made with one kind of flower only with appropriate foliage, or with two or three kinds of flowers of harmonious colouring. It may be accepted as a rule that the greater the number of varieties and colours of flowers used, the greater the difficulty of making a satisfactory arrangement. Some kinds of flowers look best on the white cloth, and in this case a bordering of flowers and foliage is placed just within the space required for the plates, glasses, &c., and a design of some kind is worked round the candelabra or other ornaments. But in the case of white or yellow flowers a bright groundwork of coloured satin is placed over the white cloth to cover the centre of the table, the margin being covered with flowers and foliage. The fewer flowers that are placed in small specimen glasses the better they look. A single Eucharis and a spray of Heliotrope, or a small truss of scarlet Geranium with a fresh frond is, generally speaking, sufficient, but much depends on the size and shape of the glass. Above all the glasses should not be tall, or of such a shape as to be easily upset, 3 inch to 3½ inch is recommended as a good height. In arranging cut flowers in stands, vases or glasses, every operator has his own particular ideas of right and wrong. We sometimes see flowers made up to a compact face as round as an inverted basin or pyramidal as a loaf of sugar, with the flowers arranged to contrast with geometrical uniformity, as for instance different varieties of Verbenas arranged according to their colours, or perhaps Chrysanthemums shaded off with the greatest regularity. This at the best is but a mechanical taste, colours in floral arrangements should certainly be blended with an eye to their contrast and effect; and no eye of real taste would tolerate an ill-balanced, miss-shaped vase of flowers, but we think it should be done with something of nature's freedom, light and graceful. The necessity of the case may be sufficient apology for the packing and building expended on a hand bouquet, but there is no such excuse for the table bouquet arranged on moss or sand; indeed many of the best of flowers of a spikate habit, such as Liliums, Calanthes, Tuberoses or Hyacinths, defy the packing process. Flowers should therefore be cut with as long stalks as possible, even Geraniums, however averse we may be to the sacrifice, ought to be cut with a piece of the wood and foliage. In making up dishes of flowers from day to day, of whatever shape, for table-decoration, there is no better medium in which to insert the flowers than pure white wet sand; the colour is not offensive when used in glass, is always clean, and it is sufficiently stiff to hold the flowers in position. When water is used it is difficult to carry out a tasteful arrangement without some stiff base being first inserted in the water, such as the sprigs of some evergreens or small foliaged Crotons. Common moss is a clumsy material for a base, however much in theory it may have to commend it. Wet sand can be trimmed into any form of surface, flat, globular or pyramidal, to suit any dish, and the building up of a graceful and showy decoration with suitable flowers is easy.

Amongst flowers most suitable for decoration Roses, as they have always and doubtless ever will, hold the first position; neither is this to be wondered at, comprising as they do, sufficient diversity of form, shades of colour innumerable, texture, &c., unequalled in delicacy of fragrance, combined with their handsome foliage which collectively are not approached by any other flower. In any sort of floral arrangement it would be difficult to find a place in which some or other of the family in the varied stages of development are not suitable. Roses are among the few flowers that, even in large quantities, can with good effect be used alone; a vase or any other ornament filled exclusively with Pelargoniums, Fuchsias, Camellias, or even Lilies, always appear to want something to give it diversity. Not so with Roses, when judiciously arranged with correct appreciation of form and colour, combined with their own foliage and a few Ferns, they constitute an assemblage of floral beauty so far complete in themselves, that the addition of anything else becomes questionable as to being an improvement. We are almost inclined to believe that the Rose monopolises too large a share of attention to the exclusion of many other less popular but almost equally deserving subjects. As an instance of this we may mention the fact that in one of the chief establishments in this country, during the whole of the last festive season, with the single exception of Eucharis Amazonica no other flowers beside Roses were used for table-decoration. This might even have been tolerated had the various forms and colours been harmoniously blended, but no! fashion decrees that decorations must be in one colour only, so a regular routine had to be kept up, crimson one day, pink the next, then yellow, and followed perhaps by pale Tea Roses; and this monotonous round of colours was kept up for nearly three months. Much as we love the Rose, we fear our devotion to the Queen of Flowers would not have survived such an ordeal.

Table decorations in this country especially are but of a transient nature, and are rarely required to last more than a few hours, and these entirely under artificial light. Many subjects therefore of a more delicate character than would be permissable in more permanent decorations may be employed. Amongst annuals, and perennials that in this country are generally cultivated as annuals, there are many choice subjects which may be advantageously

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employed, such as the Calendulas, annual Chrysanthemums, Antirrhinums, the numerous forms of Lupins, German Asters and double Petunias. The flowers of the scarlet and yellow Nasturtiums last a long time in wet sand and are very effective; Verbenas also make a nice change in their season, but the flowers of these should be cut in the morning when the dew is on them.

Amongst our flowering shrubs also we may find much variety; take for instance the many forms of Hibiscus, Ixora, Gardenia, Barleria, Eranthemums, &c. Climbing plants also furnish much useful material, amongst which may be mentioned the Passifloras, Allamandas, Begonias, Petrea, and Beaumontia grandiflora, one of the most beautiful of all climbing plants, and last, but not least, the Antigonons. Ascending yet a step higher we possess a wealth of material in many of our gorgeous flowering trees; take for instance the Indian Laburnum (*Cassia fistula*), Bauhinias, Lagerstörmias and the gorgeous Poincianas. Poinciana regia has been so extensively employed in street planting and in the decoration of public and private gardens in Calcutta and many other parts of India as to have caused many people to become thoroughly prejudiced against it, and it must be admitted that the dense sheet of vivid crimson which a well flowered specimen presents during the months of April and May, has anything but a soothing effect, under the influence of a punkah and the many other luxuries of indoor life this prejudice may be laid aside, and we would strongly recommend those who have never tried the experiment, to employ the flowers from any well coloured specimen, judiciously blended with Gardenia or any other choice white subject, using the leaves of the Poinciana for garniture; if judiciously arranged this has a most pleasing effect.

In order to obviate the great waste that occurs in floral decoration, various expedients have been resorted to, such as using different kinds of water, the addition of chemicals, &c.; but the only real remedy is a cool atmosphere and the removal of stands from the immediate neighbourhood of lamps or other artificial lights, for on account of its dryness the heat from these is more destructive to flowers than the greatest heat of summer. Those therefore who do not possess large reserves of flowers with which to replenish their vases, will do well to make their displays in the coolest positions possible. It is also indispensible for the economic arrangement of flowers to have vases of various sizes, for while many of the most useful flowers cannot be procured with stalks long enough for deep vases without greatly disfiguring the plants from which they are cut, they may be made to look very effective in flat decorations. For this purpose there is nothing better than glass baskets 6 or 8 inches in diameter, a size suitable both for dinner-table and drawing-room. As regards the height desirable for vases, all depends on the size of the apartment in which they are placed. The best effects are most readily obtained by the use of moderate size vases, as the material for furnishing them properly is much more varied. Highly coloured or figured vases are objectionable, inasmuch as both colours and figures detract from the effect. For the arrangement of cut flowers, however, no specific rules can be laid down; but it may be well to bear in mind that the more nearly the flowers are placed in the positions in which they grow naturally, the better will be the results. Sprays of climbing or trailing plants should invariably hang gracefully over the edges of the vases, for when reversed, as is sometimes done, the effect is stiff, formal and unnatural.

Editorial Notes.

Mr. George Dines, who has made extensive experiments and observations on the formation of dew, finds that the depth of deposit in England in an evening rarely exceeds a hundredth part of an inch, and that the average annual depth of the dew deposited upon the surface of the earth does not exceed an inch and a half.

A Land of Cultivators.—Upwards of 5,500,000 men are engaged in agriculture in the United States —373,455 in the State of New York alone, 375,407 in Illinois, 396,267 in Ohio, and between 200,000 and 300,000 each among other Northern or Middle States, in Indiana, Iowa, Kentucky, Missouri, Pennsylvania, Tennessee, and Virginia.

Botanical Instruction in Berlin.—The educational authorities of Berlin possess an enormous garden in one of the suburbs of the city for the purpose of supplying all the schools with fresh botanical specimens. The distribution takes place regularly after April 1, and over 4,000,000 plants are required for botanical instruction in the course of the year.

Roadside Trees.—The French Department of Public Works reports among other things the progress made in the great national work of planting the leading highways with trees. From this it appears that the total length of the *Routes Nationales*—high roads—is about 25,000 miles, of which 14,830 miles may be bordered with trees. Of this distance nearly 9000 miles are planted, while 5840 miles remain to be done. The number of trees used to form the welcome avenue is 2,691,698.

Sulphur.—A deposit of sulphur was lately accidentally discovered in the Narsapur taluk in Godavery. In digging on a piece of waste land, some earth was turned up, the peculiar appearance of which attracted the attention of one of the passers-by, the village Magistrate, who, having secured a small quantity of it, forwarded it to the Civil Surgeon. A rough analysis of the earth disclosed that it was strongly impregnated with sulphur, and a further examination of the locality in which it was found resulted in the discovery that the deposit extended over a considerable area.—*Indian Agricultural Gazette.*

Cement for Aquaria.—The "Polytechnisches Notizblatt" gives two recipes for a cement for joining glass, wood, and metal. The first consists of a mixture of equal parts of shellac and powdered pumice-stone, to be used while warm; the second is obtained by melting ordinary brimstone in a ladle, and adding an equal proportion of powdered pumice-stone. The pumice-stone in both cases must be thoroughly dried before mixing, as it is apt to absorb moisture from the air.—*C. W. Quin.*

Potato Celluloid.—According to a Vienna journal a substance may be produced from potatoes possessing the properties of celluloid. For this purpose the peeled potatoes are boiled for thirty-six hours in a fluid consisting of eight parts sulphuric acid and 100 parts water, then dried between blotting paper, and relieved of the superfluous water by pressing. Pipe bowls are at present made there from in France that can barely be distinguished from real meerschaum, and billiard balls are likewise made from it by strongly pressing.—*Electrical Trades Journal.*

Plants in Money.—A number of persons have tried to find money in plants, and failed. On the other hand a Hungarian

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scientist tried to find plants in money and succeeded. The money was in the form of bank notes, even those which had been in circulation but a short time. To be sure, the plants are so very small that a powerful microscope is required to see them. Nevertheless, they are as much plants as is a pumpkin vine, or an oak tree. What is lacking in the size of the plants, is made up in that of their names. One of them is *Saccharomyces cerevisiæ*, another *Pleurococcus monetarum*, and so on. These little plants with such large names, can grow and multiply in the substance of a bank bill, and the matters that adhere to it, without its owner being any the wiser for it.

Fungi.—Foreigners eat a great many more sorts of fungi than we do, but then they are in some places, Rome especially, under the management of a Government official. Such, at any rate, writes a correspondent, was the case a few years ago. All the fungi brought into Rome at the different gates during certain seasons of the year—forty days in autumn and twenty in spring—were registered and sent to a central depôt, there to be daily examined by an inspector. This gentleman's office was not a sinecure, considering the enormous quantities deposited in the fungus-market. No one was allowed to hawk fungi about the streets, and all the stale or worm-eaten mushrooms of the preceding day were sent under proper escort to the Tiber. For weeks and weeks together fungi furnish Italians, French, and Germans with good nourishing food, while in England, where even a still greater number of esculent fungi are found, *we* throw the God-sent blessing away.

Saltpetre and Stumps.—Many inquirers want to try the saltpetre process, for getting rid of stumps, and ask our advice. It is—don't do it. If you are infatuated with the idea, that a quantity of saltpetre put into an augur-hole will rot the stump, go ahead and fail. It will cost you but a trifle, and every well-tried experiment is useful to yourselves and others. Never be ashamed to report the exact result. Mr. "I-told-you-so" may laugh. The more fool he. There is something attractive about the idea. We all know, that a piece of wood saturated with saltpetre, will burn up quickly and thoroughly. Why should not a stump? So it will—but then, you cannot get the whole or much of the stump saturated with the salt, and dry enough, to burn by any such process as described, so far as known. Many who have tried to thus get rid of stumps, report that it does not work.—*American Agriculturist.*

Effects of Sea Water on Land.—Mr. Reinders, from one of the German agricultural experimental stations, says:—Land that has been submerged by sea water generally proves sterile for some time, in some cases for ten to fifteen years. This can be traced to the co-operation of the three following chemical causes, in addition to the mechanical injuries produced by the inundation:—1. To the introduction of too great a proportion of chlorine salts. 2. To the hygroscopic property communicated to it, preventing it from drying properly. 3. From the formation of green vitriol or sulphate of iron, which is known to exert a very prejudicial effect upon plant growth. Land which has thus been damaged should be drained as quickly as possible, and sown with Grass and Clover and allowed to rest. Experience shows that it recovers its fertility sooner if treated in this way than if cultivated all the year round as arable land.

Apple Production in Canada.—We have it on authority that the production of Apples in Canada is very largely on the increase. It is authoritatively stated that "the Apple production of the Annapolis Valley, in Nova Scotia, is now about 200,000 barrels during good years, of which 100,000 are exported to Europe. It is only of late years that the people of the Valley have awakened to the remarkable adaptability of their lands to Apple culture. Cheap railway and ocean communication, and the opening of the English markets a few years ago, inaugurated, however, a new era. In 1871 the acreage of the Valley devoted to Apple culture was 5,152, in 1881 it had increased to 8,500, to-day it is over 10,000 acres. When the next census is taken, there is every reason to believe it will be 16,000 acres, while the acreage of the province which to-day is about 25,000, will then be, at least, 30,000 acres. —*Gardening World.*

Dried Tomatoes.—Housekeepers in the country who have many Tomatoes can, according to the "American Agriculturist," easily preserve a large quantity of this very easily-cultivated fruit by drying it. This method requires little outlay, and comparatively little trouble. Scald and peel the Tomatoes, as for canning. Boil them slowly in a porcelain kettle or stone jar until the original quantity is reduced one-half. Then season them in the proportion of a teaspoonful of salt, and half-a-cupful of sugar to a gallon of stewed Tomatoes. Spread on plates and dry quickly without scorching. As the moisture dries away, and the stewed fruit loses shape, scrape it up so that both sides may dry, and let the contents of several plates, heaped up lightly, stand in bright sunshine a little while before putting away. Store in bags and keep dry. When wanted for use soak them in a quantity of water for several hours, or overnight. Stew in the same water long and slowly—three or four hours—keeping boiling water at hand to add if it grows thick, and so is in danger of burning. It should be quite thin when done, and may be thickened with bread crumbs and seasoned.

Ages of German Forest Trees.—A writer in the *Forstlichen Blätter* expresses the opinion that the assumed age of 1000 years of German forest trees is a myth—that, even in the case of so-called historical trees, an age higher than between 700 and 800 years has not been proved, and that no German tree reaches that age in a healthy state. Trees of such antiquity are always hollow, and continue to exist only as ruins. As regards the limit of health of trees, it may be assumed that much depends, not only on the kind of wood, but also on the climate and the soil. The highest age which trees reach in a healthy condition is found in foliferous trees, not in coniferous trees. After that age has been reached, coniferous die off, whilst foliated may continue to vegetate for some time after having reached the limit of health. The highest age, found by counting the annual rings, is between 500 and 700 years, and this age is reached by the fir in the Böhmerwald and the pine in Finland and Sweden. The next highest age is reached by the silver fir, which, in the Böhmerwald, was found to be 429 years. The larch reaches the highest age of 274 years (in Bavaria). Of foliferous trees, the oak appears to resist the longest, the oldest known specimen (near Aschaffenburg), a holm oak, counting 410 years. In the case of the common oak, the oldest specimens, in which the heart was beginning to decay, being 815 and 820 years old. But the common oak grows much thicker than the holm oak. The oldest red beech trees have been found near Aschaffenburg (245 years) and Weisswasser (226 years). The maximum ages of the other kinds of German trees are as follows: Ash, 170 years; elm, 130; birch, 160-200; asp, 210; red alder, 145; mountain maple, 224 years. The tree most numerously represented amongst historical trees—the lime tree—is found the least in the collection to wood of old and oldest trees. This may be due of the fact that old and healthy lime are most scarce.—*Field.*

Original Articles.

BULB GARDENING IN INDIA.

Since the publication of the correspondence in the *Pioneer* under the above heading, and which was reproduced in our last issue, we have received many enquiries for further information on the subject both from residents on the plains and on the hills. We are glad to see so much interest being evinced in a matter that we had hitherto believed possessed attractions for but a very few Amateur Gardeners in this country. The term Bulb-Gardening is certainly a very comprehensive one, embracing an infinite variety of

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materials, and to deal with it exhaustively, giving details of all of the many species and varieties coming under this category, would require more space than we have at command. We hope, however, in a series of papers to give instructions for the cultivation and also descriptions of the most popular families and species belonging to the various orders of bulbous, rhizomanthus or tuberous-rooted plants.

Liliums or Lilies.

Much confusion exists in the employment of the term "Lily" to many other species of plants, for instance, in this country it is frequently applied to the Amaryllis, Crinum, Tuberose, Eucharis, Zephyranthes and other genera; then we have the Water Lily, the Lily of the Valley, the Lent Lily, the Scarborough Lily, the Belladonna Lily and several others, none of which are true Lilies.

The Lily has a very wide geographical range, spreading from central Europe to the Phillipines, and species are found in all quarters of the globe, though the chief homes of the family seem to be in California and Japan. In India also we have several beautiful species, including *L. giganteum*, *L. Wallichianum*, *L. Neilgherrense*, *L. Nepalense* and *L. Polyphyllum*.

The cultivation of Lilies is pursued with ardour by a vast number of English Amateurs and with varying success, and the points of special interest that arise out of peculiar successes or conspicuous failures are eagerly discussed. Quite recently a distinguished student and careful cultivator of Lilies has made a declaration which suggests his entertainment of a suspicion that a certain number of Lilies are utterly unmanageable, and for that reason unworthy of further consideration. This is like the cry of despair the hopeful sometimes utter, not because they have really ceased to be hopeful, but because the sanguine temperament that compels them to be hopeful is one that chafes much under the smallest disappointment. But this declaration is full of meaning, and it at least illustrates in a curious way the satirical remark of Talleyrand, that language was given us to conceal our thoughts. But we are not casting reflections on the plain spoken person who inclines to regard certain Lilies as white elephants, for in truth we have in mind another class of writers, who write much and usually dip their pens in rose-coloured ink, and at all events take care not to tell us all they know about the cultivation of Lilies. The truth is, the failures are more frequent than are confessed, and it is a relief in the interest of truth when a gentleman well schooled in the subject, out of sheer candour, even if seasoned with impatience, groans aloud about the proximity of lily culture to the impossible. The subject is in no respect new, but as a matter of special interest and importance it may be said to date from the introduction of that noble species *Lilium auratum*, which is perhaps the most troublesome of all if we except the Canadian Lilies, which in this connection are scarcely worthy of mention. Yet Auratum with all its eccentricities of character does in many instances very happily comply with the conditions of cultivation it is subjected to. Generally speaking, those who do the least for it appear to have the best fortune, but it is rather a difficult matter to sum up in black and white the exact requirements of this species, because it often proves a bugbear where the conditions appear eminently favourable: but we cannot say, on the other hand, that it often succeeds where the conditions are apparently unfavourable. Thus in a negative way we get at something definite, and it clearly appears that in the endeavour to enjoy fully the splendour of this glorious plant, we must at least ensure that the conditions are favourable. The question thence arises,—what sort of condition should we look for? As regards soil, there is in the first instance a general objection to a calcareous staple; therefore it is not a chalk or a lime-stone plant. A mellow turfy loam or a sandy soil rich in humus, appears to be best adapted to it. This point being settled, all the rest may be summed up in the general statement that extremes of all kinds, whether of cold or heat, drought or moisture, are inimical to this the loveliest of all Lilies. This accounts for its fine growth in moist, sheltered, well-drained, partially shaded situations, where the soil is of a kindly nature and free from any special taint of calcareous salts. This queen of the Lilies may be taken as representing pretty fairly the whole of the tribe as regards the primary conditions of cultivation. They do not all perish if in contact with calcareous matters, but they certainly do not thrive so well as on kindly soils that are free of these materials. They all like a nourishing soil of considerable depth and pretty constant humidity, while they are almost as happy on clay as on chalk, and a saturated soil is but a grave for them. There will be fewer failures in Lily culture if amateurs will take the trouble to think out all that is implied in these remarks.

If we may regard *Auratum* as the queen of Lilies, it will be none the less fair to regard *Speciosum* as the maid of all work, and a very pretty maid of all work it will perhaps be said. But this certainly is the most useful of all the tribe, not excepting even the homely *candidum*, which Nature seems to have destined to play the part of village coquette. The common white lily will thrive in many places, more especially in heavy soils, where *speciosum* would fare but poorly; but all things considered *speciosum* is more accommodating than any other Lily, and hence it is in addition to its rich beauty that it is grown so extensively. This maid of all work illustrates how easily and cheaply we may have a feast of Lilies notwithstanding all that has been said about the capriciousness of the tribe. No one would be long baffled with such useful Lilies as *Tigrinum*, *Longiflorum*, *Teastaceum*, *Bulbiferum*, *Croceum*, *Candidum*, *Davuricum*, *Szovitzianum*, and *Chalcedonicum*, for fairly good conditions suit them well enough, and one of the secrets of success is to leave them alone and enjoy their flowers without prying into the state of their growth underground.

It would be interesting, as well as profitable to Lily growers, to know exactly under what conditions L. auratum and others are grown in their native habitat, that they might, in planting, shape their course accordingly. The formation of the stems, and the great length of most of them, with their sparse foliage, would lead one to infer that Nature has adapted them to find their way through amongst scrub or low-lying herbage of some kind, clear of which they can raise their magnificent heads of bloom. Be this as it may, we have always found that they do much the best in a situation that accords in some measure with conditions similar to those just mentioned, and that partial shade, and moderately moist, cool soil, are the principal essentials to their successful cultivation. If we examine the lower part of the stem of a Lily, we shall find that when in a young state they begin to emit a quantity of roots around their base, which roots, of course, are intended to forage for them and afford the requisite support to the flowers. It must be obvious, therefore, if these feeders be dried up, or suffer from lack of moisture, that the tops have to draw the whole of their sustenance from the bulbs, which tax on their energies prevents the formation of others to supply their places the following year. This would necessarily occur with any growing where the surface soil became parched from the heat of the sun, and therefore any that are at all exposed should have a mulching of some non-conducting material or other, such as half-rotten leaves or very mild manure, so as to intercept evaporation. This, with a good watering or two during the active growing season, and when the blooms are showing, will be found of the greatest assistance to them.

Although Lilies are such moisture-loving plants, at certain time of the year anything approaching a wet, stagnant condition of the soil is fatal to them; and more especially is this the case when they are in a semi-dormant state, as then they take up water slowly. The best way before planting is to thoroughly trench the ground by breaking it up to a good depth, and when doing so, to work in plenty of turfy loam if it can be readily got, or if not, a liberal dressing of leaf-mould in lieu of it. A bed or border so prepared will grow any of the kinds well, but with many of them it is a great help if holes are dug out where the bulbs are to be placed, and filled in with rough, fibry loam and sharp, clean sand, a mixture that is highly congenial to them and keeps them clean and free from decay. The sand should not be omitted, as a handful or two of it placed around each cuts off their contact with the moist earth that would otherwise press too closely about them. Where it is intended to grow Lilies in shrubbery or herbaceous borders, in isolated patches or groups, the same kind of preparation may readily be carried out, only the holes dug for them in that case should be made to hold at least a bushel of the mixture above referred to, as then their well-doing will be a matter of certainty. The only natural soil we have ever seen them succeed in in a really satisfactory manner is a greasy, moist sand, in which they grow with great vigour and increase at a rapid rate compared with what they do when not so circumstanced. We have noticed

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that most of the imported bulbs of L. auratum are coated with the same kind of soil, thus showing that in Japan, where they must grow in immense quantities, the soil they are found in is of a similar nature. As regards the time of planting, the earlier it is done in the autumn after the leaves and stems are ripe, the better, as immediately these die down large fleshy roots at the base of the bulbs begin to form, and it is almost impossible to interfere with them later on without bruising or damaging these to some considerable extent. Such as come from a distance, or have been long out of the ground, are destitute of these feeders, and every day's delay in planting detracts from their strength, as they are then living, as it were, on themselves, instead of drawing their supplies from the soil. The proper depth at which to place the bulbs is about 6 in. below the surface, or even a little more than that for the large, strong growers, that require so much extra moisture. In potting, however, it is much the best way not to cover them deeply, but to leave space to top-dress with large lumps of soil as the shoots progress, and these they seize hold of greedily and derive additional strength therefrom. Potting, like planting, should be done early, and the ball disturbed as little as possible, at least that portion of it below the base of the bulbs in which the large fleshy roots are embedded. That on the top will break away with the old stems and leave the crowns bare, among which some silver sand should be scattered so as to work in and fill up the interstices among the scales. For pot culture there is nothing equal to a mixture of rough, fibry loam and leaf mould in about equal proportions, through which the roots of the Lilies run easily and water percolates readily.

(*To be continued.*)

PALMS AND THEIR USES.

In addition to the large number of species of Palms that are so highly prized for their handsome foliage there are also many kinds of great economic value, the following list of which, taken from Smith's Dictionary of Economic Plants, will doubtless prove interesting to many of our readers.

Cabbage Palm (*Areca oleracea*).—A common Palm of the West Indies. It has a slender stem, and grows to a great height. This and others of the same nature are called Cabbage Palms on account of their young unexpanded leaves being used as a vegetable. To obtain this insignificant morsel these noble trees, some a hundred years old, and 100 feet high, have to be cut down.

Chusan Palm (*Chamærops Fortunei*).—A fan-leaved Palm, native of Chusan and the north of China, attaining a height of 12 or more feet. The sheath at the base of the leaves becomes with age strongly fibrous, similar to that of the Piassaba of tropical America. The agricultural labourers in the north of China make coats and hats of the fibrous substance, which has a very Robinson-Crusoe-like appearance, but is good for keeping out the rain. It is also used for making ropes and cables, and is very strong and durable, even under water. This palm was introduced into this country (England) in 1844, and is hardy in sheltered situations in southern counties. It was first supposed to be *C. excelsa* of Thunb., a palm similar in habit, native of Japan, and applied to similar purposes, of which, about 50 years ago, a few plants were introduced to Holland, one being in 1837 sent to Kew, and is now 12 feet high, with a girth 1 foot 7 inches. One of the originals sent by Mr. Fortune to Kew in 1844 was planted in the front of the Royal Residence, Osborne, Isle of Wight; in 1881 it attained a height of 14½ feet, and girth 3 feet; spread of leaves 9 feet across.

Cocoa Nut (*Cocos nucifera*).—A Palm, native of the coasts of tropical Africa, India, Malay, and Islands of the Indian and Pacific Oceans. It is generally cultivated throughout all tropical countries, but thrives best near the sea, and requires no special care. The tree varies in height from 50 to 100 feet, and has long-winged leaves, the so-called nuts being produced in bunches of 10 to 20 or more together. They are of a triangular form, about a foot long, consisting of a thick coat of fibre, enclosing a hard shell, which, with its contents, is known as the Cocoa-nut. It is commonly said that the uses of the Cocoa-nut are as numerous as the days in a year, affording food, drink, domestic utensils, and materials for building and thatching. In some parts of India and other countries, the white albumen of the nut forms nearly the entire food of the natives, and the white fluid or milk serves them for drink. It also yields wine and sugar. Cocoa-nut oil is obtained by pressing the albumen. When fresh it is transparent, and is then used in cookery. Large quantities of it are imported into this country under the name of Copra; the thicker portion, called Stearine, being used for making candles, while the clear oil is used for burning in lamps. The well-known substance Glycerine is obtained in the process of purifying Cocoa-nut oil. Formerly the fibre was used for making coir ropes only, but within the last 30 years it has been manufactured into floor-matting, brushes and brooms, and is used for stuffing cushions, as well as for many other purposes. The hard shell is made into cups and other domestic utensils. The wood is known as Porcupine wood.

Cocoa-nut Double (*Lodoicea seychellarum*.)—This may be considered the largest and most remarkable of Palms. It is a native of a small group of islands in the Indian Ocean called the Seychelles. It is said to attain a height of 100 feet, its stem being 1½ to 2 feet in diameter, bearing at the summit a crown of fan-shaped leaves. It is remarkable for growing in a socket of hard woody texture, perforated with holes made by the roots. This curious appendage derives its origin from the cotyledon, which in this palm attains the extraordinary length of 2 feet, growing downwards like a root, having the germ (plumule) seated in its thickened end. When perfect, the thick end opens on one side like a sheath, out of which rise the first succeeding leaves of the plant, roots also being produced, which make their exit by piercing the end of the sheath. In time the nutriment of the nut becomes exhausted, and the part of the cotyledon between it and the young plant withers. The latter, however, retains its placental vital connection with the sheath end of the cotyledon, which is henceforth nourished by the plant, and increases in size with its growth, which thus continues seated in the cradle of its birth through life. This formation appears, however, to be common to the palms, but very much more largely developed in the Lodoicea. The fruit is a large oblong nut, covered with a thin rind. After the removal of the outer envelope or rind, the fruit has the appearance of two oblong nuts, firmly united together, and often weighs 30 to 40 lbs. They are borne in bunches, each consisting of nine or ten nuts, so that a whole bunch will often weigh 400 lbs. It takes ten years to ripen its fruit, the albumen of which is similar to that of the common cocoa-nut, but is too hard and horny to serve as food. The shell is converted into many useful articles by the natives, but the most important part is the leaves, which are made into hats, baskets, and the like. The demand has of late years become so great that in order to obtain the leaves the trees are cut down, and as no care is taken to form new plantations, it was at one time feared this palm would eventually become extinct. In 1864 the leading botanists in this country petitioned the Government for its protection. By more recent information, however, it appears that in one island alone there are many thousands of trees.

Cohune Palm (*Altalea Cohune*)—A wing-leaved Palm similar in appearance to the cocoa-nut, but it does not attain such a great height, and has a thicker stem. It is abundant in Honduras and Darien. The fruit is produced in large bunches, each fruit being about the size of a turkey's egg. The kernel of the nut tastes like that of the cocoa-nut, but contains more oil, which is of a finer quality. It is obtained by crushing the nuts. This palm may also be termed a wine palm, the trunk containing a great quantity of liquor which is obtained by cutting the tree down and making a deep hole near the top, and by slightly raising the butt end the liquor flows into the hole, and is readily obtained by slipping in a small vessel. This supply continues a considerable time, and forms a cooling drink to passers-by.

Coquito Nut (*Jubæa spectabilis*).—A wing-leaved Palm rising to considerable height, having somewhat the appearance of the Date Palm. It is a native of Chili. The stem contains a sugary sap, to obtain which the tree is felled and the leaves closely cut off, the sap then begins to flow, and it continues to do so for several months till the whole of the stem is exhausted. The sap is then

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boiled and is of the consistency of treacle. In Chili it forms an article of trade, being used as a substitute for sugar under the name of Meil de Palma or Palm Honey. In warm situations in this country this palm will thrive in the open air.

Date Palm (*Phœnix dactylifera*).—A wing-leaved palm, attaining a height of 50 feet or more. It is a native of North Africa, Egypt, Syria and Arabia, and has become naturalised in Spain and other parts of Southern Europe. It may truly be called the "Palm of the Desert," occupying the fertile spots called oases. Its fruits are produced in bunches of 200 300 or more. They contain a great quantity of sugar, and are highly nutritious, forming an important article of food to millions of people. The hard kernels of the fruit are ground, and serve as food for camels and other domestic animals. Date stones have recently been brought to notice as a substitute for coffee, and are now roasted and sold in large quantities under the name of Date coffee. Dates form an important article of trade to this country, chiefly from the North African ports.

Gingerbread or Doum Palm of Egypt (*Hyphæne thebaica*).—Native of Upper Egypt, Nubia, Abyssinia and adjacent countries. Its stem is a foot or more in diameter, and by age becomes branched, attaining the height of 20 or more feet, each branch bearing a crown of fan leaves. Its fruits are borne in large pendulous bunches, bearing one or two hundred each. Each fruit is about the size of an apple, and is covered with a fibrous pulp, which has the flavour of Gingerbread, and forms part of the food of the lower classes of Upper Egypt.

Ivory Nut Palm (*Phytelephus macrocarpa*).—Native of New Grenada, and other parts of Central America. The stem is generally 6 to 8 inches in diameter, sub-erect, decumbent or even creeping on the ground, bearing a fascicle of pinnate leaves 18 to 20 feet long, the pinnæ being narrow like those of the date palm. The fruit consists of about 40 nuts enclosed in a spathe of the globular form, the size of a man's head, borne on a short foot-stalk issuing from the axis of the leaves, the whole head weighing about 30 lbs. The nuts are about the size of green walnuts, not quite round, covered with a thin pulpy coat, of which a favourite beverage is made by the natives The nut is very solid, hard, and white, and when polished has the appearance and hardness of ivory: large quantities are imported to this country (England) and the United States, and made into buttons, umbrella handles, knobs for doors, work-boxes, toys, &c. This plant was at one time classified amongst the palms, but is now put in an order under the name Phytelephasiess.

The term Vegetable Ivory is also given to the seeds of *Sagus amicarum*, a palm closely allied to the Sago palm, a native of the Friendly Islands. Its nuts are used for the same purpose as the preceding, but are not so hard.

Jagua Palm, the native name for *Maximiliana regia*.—A noble wing-leaved palm, native of Northern Brazil and the regions of the head waters of the Orinoco and Amazon. It attains a height of 100 feet, with a head of leaves each 30 feet in height. Its inflorescence consists of a dense bunch of small flowers contained in a spathe 5 feet in length, and when open, 2 feet wide, much resembling a boat with a long point like a bow-sprit. These spathes when dry are hard and rigid, and are used for a variety of domestic purposes by the Indians, such as nursing cradles, baskets, and water vessels. A palm called Inaja by the Indians appears to be same species as the Jagua.

Jupati Palm, the native name for *Raphia tædigera*—A noble wing-leaved palm, native of the lower valley of the Amazon and Orinoco. The wood is used by the natives for the walls of their houses, and for many other domestic purposes. An allied species is R Ruffia, native of Madagascar and Mauritius, remarkable for its large fruiting spadices. A specimen in the Kew Museum measures nearly 15 feet in length, and weighs between 200 and 300 lbs. Each fruit is about the size of an egg. The shell consists of closely imbricated smooth scales which, when dry, are hard and of a brown colour. The cuticle of the leaves of this palm has of late years been imported into this country in considerable quantities for tying plants, instead of bass, under the name of Raffia or Roffia.

Macaw Palm or Gru-Gru (*Acrocomia fusiformis*)—A tall, stout, prickly-stemmed, wing-leaved palm, native of Jamaica and other West Indian Islands. The fruit is round, about the size of a small apple, and produced in bunches. The nut is hard, and contains oil which is obtained either by crushing or grinding in a mill to a paste, and after being purified it is similar to butter of a light yellow colour. It has the odour of violets, and a sweetish taste. It is employed in the manufacture of scented toilet soap. The hard shell of the nut is ornamentally carved by the negroes, and formed into toys and trinkets. The wood of the stem is very hard, and is used for many purposes. This is now found to be the same palm as the Cocos aculeata of Hortus Kewensis, named by Martius *A. sclerocarpa*.

Miriti or Ita Palm, the Indian name for *Mauritia flexuosa*. Native of the swamps of the Orinoco. It is also stated to be found at the sources of the Orinoco, at an elevation of 4263 feet. It is a magnificent palm, its cylindrical stems rising like Grecian columns to a height of 100 or 150 feet, terminated by a crown of large fan-shaped leaves, from the base of which is produced a big bunch of pendulous fruits, some measuring 8 to 10 feet in length, weighing 2 or 3 cwts., and containing several bushels of fruit. Each fruit is about the size of a small apple, having a reticulated, polished, smooth shell. The Guarano tribe of Indians, during the period of the inundations by the Orinoco, suspend their dwellings from the stems of this palm. These dwellings consist of a floor made of its leaves, on one part of which they place a little earth whereon to make their fire. Its shelly fruit, its farinaceous pith (sago), and its juice abounding in saccharine matter, and the fibres of its petioles furnish them with food, wine, and thread for making cord and weaving hammocks.

> "Wide o'er his isles, the branching Oronoque
> "Rolls a brown deluge; and the native drives
> "To dwell aloft on life-sufficing trees;
> "At once his dome, his robe, his food, and arms."—*Thomson.*

The same materials are also furnished by an allied species, *M. vinifera*, the thin pulp of the fruit of which is edible, having a sweet slightly acid taste, and a kind of wine is made from it.

Palmetto Palm (*Chamærops* or *Sabal Palmetto*).—A fan-leaved palm, attaining a height of 10 or more feet, occupying large tracts on the Atlantic coasts of the Southern United States. It was adopted as an emblem on the banners of the Southern Confederation.

Palmetto Royal, a name in Jamaica for *Sabal umbraculifera*.—A noble fan-leaved palm, attaining a height of 80 to 100 feet, with a circumference of 5 to 6 feet; native of a hot valley in Jamaica known as the Pedro Plains, where it abounds. Its tall naked stems, crowned with large fan-shaped glaucous leaves, form a grand aspect in nature. Its fruit is produced in branched panicles, consisting of large blackish berreis like a small date, and the sweet pulp furnishes food for numerous kinds of birds It is also known by the name of *big thatch* and *bull thatch*, and, as the name implies, is used for thatching houses. Hats, ropes, mats, and baskets are made of it. The trunk is smooth and externally hard, and of iron-like firmness, while the interior is soft and spongy. It is cut into lengths, and the soft centre being removed a hollow cylinder is thus formed which is used for many purposes. A noble specimen of this palm, 20 feet high, is to be seen in the Palm house, Royal Gardens, Kew.

Palmetto Saw (*Chamærops serrulata*).—A decumbent-stemmed palm, attaining a height of 3 to 4 feet, having fan-shaped leaves with edges of the segments sharply serrulate, as also that of the foot-stalk, spadix tomentose, shorter than the leaves. Fruit an ovoid oblong drupe of a dark colour, the size of an olive. It is a remarkable palm, forming a Palmetto scrub for hundreds of miles on the sea-coasts of Georgia, South Carolina and Florida. Its density and sharp-edged leaves render it impossible for human beings to pass through it. The inhabitants make use of the leaves for thatching, and they are also collected for paper-making, and scrubbing brushes are formed of the tough fibrous roots. The fruit, although sweet, cannot be called palatable; it contains a fixed and volatile oil, which is obtained from the expressed juice; when boiled in water the volatile oil is set free, filling the atmosphere for a great distance, and causing dizziness and headache. Many medicinal properties are assigned to it. This palm is by some botanists placed in the genus *Sabal*.

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PALMYRA PALM (*Borassus flabelliformis*).—A large fan-leaved palm, native of India and Ceylon. It has a cylindrical stem, attaining a height of 50 or 100 feet, bearing a crown of large fan-shaped leaves. It produces its fruit in bunches, each fruit being about 3inches in diameter with a pulpy covering, which is made into a kind of jelly. It is a toddy-yielding palm, and large quantities of jaggery sugar are obtained from it. The young plants are used as a vegetable. The wood of its stem is hard, and employed for all manner of domestic purposes,and umbrellas and books are made of its leaves. It is represented in Central Africa by B. œthiopum, which is widely spread within the tropics ; its fruit is somewhat larger than its Indian ally, but similar in form, and of a dark yellow colour. It consists of a fibrous, pulpy husk, of an agreeable odour and acid-sweet taste ; it is eaten, or rather sucked, by the natives The young seedling plants are used as a vegetable in the same way as those of the last-named species are in India, but the sap of the palm is not extracted for making toddy, wine, or sugar. In Gambia it is called the Run Palm, and is considered to be the most valuable wood for building ; it resists the attack of white ants, and remains sound under water for years ; it is very hard, and takes a fine polish. Trees have been seen is Gambia 90 to 120 feet high, of which 80 feet or more of the trunk are perfectly clean,and somewhat swollen about half-way up.

THATCH PALMS, a name given in Jamaica to several species of low-growing fan-palms, such as *Thrinax parviflora*, *T. argentea*, and in North America to *Sabal Palmetto* and *S. Adansonii*, and *Euterpe montana* in Brazil. A wing-leaved species is called Mountain Thatch. As the name implies, they are employed by the Negroes for thatching their huts, and for making hats and baskets. The unexpanded leaves of the Palmetto or Silver Thatch (*T. argentea*) were largely imported some years ago for making Chip Palm Hats.

WAX PALM.—There are two so-called : (1) *Copernicia cerifera*, a fan-palm, native of Brazil, its cylindrical stem rising to a height of about 40 feet and measuring a foot in diameter, curiously studded its whole length with the permanent base foot-stalk of the leaves in the form of knobs. The wood is very hard, and is imported into this country for cabinet-work. Its young leaves are covered with a waxy secretion, which is obtained by shaking and beating them ; it is imported into this country for making candles. (2) *Ceroxylon andicola*, a tall wing-leaved palm, native of the elevated regions of New Grenada. The whole of the stem and leaves is covered with a whitish waxy substance, which is collected from the stem by scraping ; it is principally used for making candles for the Roman Catholic churches, and forms an article of trade.

NATURAL HABIT v. TRAINING AND STAKING.

With nearly all plant growers now-a-days, it is a foregone conclusion that their specimens, whether for exhibition or not, must be trained into some kind of artificial shape. An Azalea, or a Rose, both of which naturally make handsome bushes, are unworthy of commendation, and quite unpresentable at an exhibition unless they represent a cone or a pyramid of the most exact proportions. Pelargoniums must be as regular as a gridiron, and as flat as a pancake Heaths, Epacrises, and similar hard-wooded plants are nothing unless they bristle with stakes, and are as round as balls; and graceful climbers and creepers are twisted in the shape of balloons and other accommodating models of a similar kind. This is no exaggerated picture, for it is one which may be seen at every horticultural exhibition. Ornamental-foliaged plants set the trainer, in great measure, at defiance; but when he can improve them, as he terms it, he does so. I have many a time seen such plants as Alocasias and Caladiums with every leaf staked out in the most methodical way; but usually such plants escape, and whether on the exhibition table or in the hothouse at home, compensate in some degree for the stiffness and formality which would otherwise be only too apparent. Horticultural exhibitions are most to blame for this state of things. The plant grower, however humble, goes to them for his models, and seeing that the largest and most perfectly geometrical specimens have been awarded the first prize by a jury of eminent horticulturists, he thinks, and quite naturally too, that it is imperative for him to follow the example there shown, and even endeavours to increase its formality. People are, however, beginning to get tired of such stiffly trained plants, and if some good plant grower had only the courage to stage a collection of healthy plants, exhibiting, as far as is practicable in artificial culture, their natural shapes, one can hardly suppose that a jury of sensible men would venture to overlook them. Of course, one need not run into an opposite extreme and renounce the use of stakes and ties altogether ; nor would I suggest a disregard to symmetry in the case of plants which naturally assume a definite form ; but I protest against the style of training which sets natural hibit at defiance, and which insists that every twig and flower be twisted about and tied till they are arranged in such a way that a single bloom could not be removed without creating a blank. I have seen Ixoras that would have been noble bushes, twisted about in all manner of ways in order to have the flowers in the form of a cone; Heaths, with their naturally erect tops twisted hither and thither, that no spot should be unoccupied—one flower being up, and another down ; Epacrises with their wreaths of flowers plastered round a bundle of stakes as tight as a drum ; Marechal Niel Roses with all their blooms fixed immovably to one side ; and many other subjects, too numerous to mention, similarly abused—just in proportion to their obstinacy or otherwise in conforming to the cultivator's art. Of course, rambling plants must be supported in some way, and others must be staked or trained out to increase their size, to admit air and light, and to accommodate them generally to the circumstances in which they are placed ; but, after this has been accomplished, what more is wanted ? A Pelargonium, if rationally treated, will make a handsome enough bush without much artificial aid ; and, singly or in collections, it will produce a more attractive display than when trained in the shape of a circle, with scarcely a green leaf visible. The much-abused Azalea, too, needs hardly any training at all. It will grow just as shapely as a Rhododendron in the open border, and be as healthy, and flower as well, or better, if left alone : and staged, where and how one will, it will afford quite as grand a display, and be ten times less monotonous, than the finest pyramid that ever was grown, and on which months of patient but useless labour have been bestowed. Then there are the Epacris and Aphelexis, which need no stakes or ties whatever. Perhaps they may not be "furnished down to the pot ;" but, if they get light, and room, and generous treatment, there will be healthy foliage, wreaths of flowers in abundance, and nothing to complain of in the matter of shape or symmetry. No one finds fault with the habit of the Rose as it grows in the open border ; why, therefore, should it be tortured out of its natural shape when grown in a pot ? Soft-wooded Heaths will bear cutting down to get good, stout, flowering shoots, but they want but little more assistance; while the close-growing, hard-wooded varieties certainly do not require a perfect forest of stakes to keep them either in shape or good health. Camellias, too, are sometimes trained like Azaleas, in the pyramid fashion—a most inexcusable practice, for does not the Camellia grow of its own accord as freely and as shapely as a laurel bush ? As to climbers, such as the Clerodendron, Stephanotis, Allamanda, Bougainvillea, Cissus, Lapageria, and others, it might reasonably be maintained that there is no excuse whatever for twisting them round stakes, trellises, or other contrivances of that kind, except to meet the necessities of exhibitors. The natural habit of such plants is to ramble at length like our Honeysuckles or Virginian Creepers, and it is only under such conditions that they can be seen to advantage, and grow most successfully and with the least trouble. In short, the artificial training of pot plants, carried as it is to excess, is the one great mistake in their culture at the present day, and must sooner or later give way under the influence of improved taste. To those who have no other desire than to see their plants healthy and handsome, we would say—give up training after the formal pattern ; give your plants room, and light, and air ; attend more to potting and watering, instead of staking and tying ; and you will have no cause to complain of ill success, and will in time come to wonder that you were ever led away by the practices just described.—S. W. in *The Garden*.

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SEASONABLE NOTES.

RE POTTING.—If not already done, Palms and other ornamental Plants should be re-potted or top-dressed according to their necessities. For the majority a mixture of loam, leaf mould and a liberal proportion of silver sand will be the most suitable. The pots used should be perfectly clean and well drained. For top-dressing use fibrous loam and old cow-manure in equal proportions.

PLANTS IN SMALL POTS that have their leaf surface large in proportion to the amount of soil in which they are grown, will require constant attention as to water, of which a frequent supply, sufficient to saturate the whole of the soil, should be given, as they invariably suffer more from a scarcity of water than those plants whose foliage-surface is more limited.

ACHIMINES.—The last batch of these should now be started, and those already growing thickly in pans separated and placed about 2 inches apart in their flowering pots or baskets. Keep them well exposed to the light, so as to prevent them becoming weak and drawn, in which state the plants present a very weedy appearance, the flowers being but little more than half the size of those produced on well-grown stocky plants. Well drained pots or pans, with well-decomposed leaf soil and loam, in the proportion of three parts of the former to one of the latter, is the best in which to grow them With the requisite shade, a moist atmosphere, and plenty of water at the roots, a satisfactory condition of these plants will be ensured. Few plants add more to the appearance of a verandah or conservatory than Achimines in baskets. The baskets should be well lined with moss to prevent the compost washing through in watering. Take plants that have been previously started in pans when about an inch high and place in the baskets with the heads outwards all over the bottom and sides and fill up with the compost previously mentioned. Grow the plants in a good light situation so as to keep them short-jointed, training them to short sticks as they advance in growth, so as to cover the whole of the baskets evenly.

ANTHURIUMS.—These are now making their young leaves, and great care will be necessary not only to keep them properly shaded, but also to secure them against the ravages of slugs and other vermin, which are very partial to their tender succulent foliage. Moderate shade, a moist atmosphere, and plenty of water at the roots, are the conditions necessary for success in growing this most useful and beautiful class of foliage plants. See that the old leaves do not overlap the young ones now emerging, and come crippled and deformed, as every leaf fully developed adds to the strength and beauty of the plants. Sponge carefully the foliage that is old enough to be treated in that way, so as to remove any scale or deposit and keep them in a clean healthy state.

CELOSIAS.—The great improvement that has been effected in these of late years renders them very acceptable plants not only for garden decoration but also for supplying cut flowers. Good strains of them make most elegant pyramidal shaped plants, clothed with long pendulous, brilliant-coloured inflorescence at the end of every shoot, and almost at every joint. These have, when well grown, a light feathery appearance, and produce a striking effect especially when seen under artificial light.

If seed be sown at once and the plants grown freely on when up, they will attain a good size by the end of August and continue blooming freely all through the autumn, a time when gay flowering plants are generally very scarce.

COCKSCOMBS.—These though not so graceful as Celosias, make a fine display when well managed, and if sown now, and similarly treated, will make fine showy heads by the autumn, when they are sure to be acceptable. But these and Celosias are gross feeders, and should have rich soils in which to grow. A fourth part of good sweet rotten manure to three parts of loam will be found to suit them well. Such masses of flower, in proportion to the size of the plants and the amount of foliage they carry, necessarily makes large demands on the roots, and to meet this and keep them of a healthy green colour, they should be assisted by a liberal supply of manure water as soon as they begin to show bloom. If either be required for seed saving purposes, they must be kept well apart, or both will be spoiled, so freely do they intermix and cross with each other.

BALSAMS, like most other free seeding plants, have of late been considerably improved, and instead of the weedy single-flowered subjects once grown, they may now be had almost as large and showy looking as a Camellia. To have them in perfection they can scarcely be over-fed, and should be grown in soil containing nearly half its bulk of manure, provided the latter be of a mild nature. Seed should now be sown in pans, and as soon as they are about two inches high, may be planted out in well-raised beds in a fully exposed situation. We however prefer the Balsam as a pot plant, and when well grown few subjects can exceed it in beauty. They are often spoiled, when in a young state, by being sown too thickly and allowed to become drawn up and weakened in the seed pans. Sow the seed thinly, potting off the young plants when they have formed their second leaves, burying the stem, if possible, up to the seed leaves. If desired of large size they must be kept shifted on so as to hasten their growth as rapidly as possible and until they are placed in their flowering pots. The blooms should be picked off as they continue to show themselves. At each shift they receive the plants may be dropped lower in the soil, that the bottom branches may be pegged or tied down so as to be level with the rim of the pot.

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OF

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ANSWERS TO CORRESPONDENTS

W. F. B.—I. The time for pruning will depend upon the season that you require the plants to bloom. Unless under very exceptional circumstances, this operation should only be carried out after the monsoon. See Answers to Correspondents in issue of April 27th, 1886.

II. Your Pine-apples have probably been treated too liberally. After the expiration of the rains withhold water from them entirely till about the commencement of January, they should then receive a good surface dressing of manure and be copiously watered. This should induce them to flower freely in February or March; as soon as the fruit is set they cannot be treated too liberally, supplying water abundantly not only to the roots but also over head. We had some fruits last season on one year old imported suckers of the Queen variety that weighed 7 and 8 lbs each.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to should be sent in not later than the Friday previous to the day of publication. All communications should be written in one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

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Extracts.

POTATOES AND FLAVOUR.

It is one of Nature's secrets which has yet to be discovered, "What gives flavour?" Of course when one gets sublimated—to the pitch of a connoisseur in wines—one would put the question differently, and say, "Whence comes aroma or bouquet?" But what holds true in wine of the rarest vintages, is true also of all fruits and vegetables. In both of these departments of earth produce, there is something in the soil, which evolves, or refuses, flavour to a very curious extent.

Of course, it is admitted that there is a great deal in variety and also in respect of sites. Yet sunshine and rain—and the action and reaction of each upon the other—do not originate flavour; for not all the sunshine and rain in the world will ever make a Sweetwater Grape taste like a Muscatel, a Beefing Apple like a Ribston Pippin, a grey Pea like a marrowfat, or a loaf made from any red wheat as light and sweet as if the miller had ground Talavera, or any one of the American bred Potatos like a Yorkshire Regent or Fluke. Allowing all the distinctions which the subtle consequences of something antecedent to the ripening of the first seed whence a variety sprung, why does a variety of fruit or vegetable taste very differently from different soils.

No one can deny that this is so. Let us dismiss all the general question; let us forget fruits, get out of greens, cut cereals, and place all our attention upon the most remarkable of roots, the *bête noir* of Cobbett the crux of political economists, the darling of Paddy, and of every mutton chop eater in the universe—the indispensable Potato.

If one reads the market reports of the districts wherein Potato growing is a prominent part of the farmer's business, one is at once met by the acknowledgment of the influence of soils. One sees, no doubt, that there is a wide discrepancy between the price of Regents, Champions, Victorias, and Magnums. Still, it is also claimed that soils, too, make variations of value. The Scotch talk of the superiority of "the red soil" Regents. What are the special characteristics of those red soils; and what is the peculiar merit which they confer upon the Potatos grown within them?

The present writer has, in a humble way, experimented with Potatos for above forty years. He has tried almost all the old kinds, and continued to try the new ones until American sorts came in upon us like a flood, and all the old familiar names were submerged. In Potatos—as in so much besides—"shows" exercise a distracting influence. We have to submit to show Potatos as to show poultry; and to see every kind of peculiarity held up to honour—except the homely one that "they bile well" and "eat like a nut." Of course the last simile has regard to flavour only. The charm of a nut is that it takes some biting. The perfection of a Potato is that it melts in the mouth and requires no mastication at all.

Now, what must a soil have to induce this peculiarity—this co-existence of the filbert flavour, and the consistency of whipped cream? It is very easy to point out what prevents these peculiarities in the Potato, which, even more than Mr. Stiggin's butter-toast, deserves the phrase of "agreeable comestible." Possibly, if one had to make one's living wholly out of Potatos the quick melting in one's mouth would not be altogether so desirable. But where the Potato is taken as an adjunct to a broil, the flesh of the tuber cannot well be too tender, or resemble too much that biblical standard of the *ne plus ultra* of good eating—"the finest wheat flour." How do soils bring out this peculiarity in the Potato? for it is an accepted fact that they do.

Having noticed how much the vital force of the earlier varieties of Potato was increased by taking up the seed when not half grown, roasting it in the full heat of a midsummer sun, preserving it in a dry light store during the winter months, it was determined to find if seed so invigorated yielded a produce of higher flavour. Of course it would not do to take up Potatos for cooking in the same premature condition which renders them the best of seed. It is with Potatos, as with Apples—the longer they are allowed to mature where they have grown, the finer the flavour. But would the same seed produce the same flavoured crop on all soils? If not, on what kind of soil would the finest flavoured tubers be obtained?

Now it is an ascertained truth that the influence of a soil upon the quality of a Potato increases as the natural vital forces diminish. A vigorous young seedling is like a wilful lad or lass. In the heyday of youth it will take its own course, and be waxy in consistence and strongly tasted let the soil be what it may.

It is when youthful vigour is declining that the Potato becomes amenable to discipline. Varieties—which when first sent out as seedlings were tough and rough flavoured—break up as they get age, and grow of finer quality year by year. This truth has been widely exemplified in the Champion sort. It is now, on favourable soils, almost as mealy as the Regent, only inferior because its deep eyes will always make it a kind which involves not only waste in peeling, but requires some skill not to pare away the best flavoured portion, *i. e.*, that which is nearest to the skin. It would now seem the same law is fulfilling itself with the fine Potato called Magnum Bonum. Big it always was, but never good till recently: and it has found tenderness and flavour, where so many other varieties have achieved these excellencies before, *i. e.*, through being planted, when in declining vigour, upon "red soil."

This is the sum of the experiments by the present writer in 1885. He has made the Magnum as tender a flesh as was the Fluke, and with as admirable a flavour—or perhaps it would be better to say "absence of flavour." Perfection in a Potato is, not that it should leave a distinct taste upon the tongue, but that it should enhance all other flavours taken with it. Magnum seed, specially saved and treated, was planted in 1885 upon three different soils—A, on a drained peat morass, *i.e.*, black soil dressed, after the water had been cut off with sand. The crop was large, the tubers handsome; when cooked, detestable. B, on a rich deep loam on a brick earth. Here the dry season arrested growth too soon. The plants made a second growth when the rain fell in August and September, and the crop is very uneven; the best are fair-flavoured only, and the worst are as bad as a Potato can be. C, was on the red gravel, which has with it a certain amount of vegetable matter, having been dressed with decayed quick-grass.

Not a particle of manure of any kind was applied, natural or chemical; the seed tubers were entrusted to the soil as it was when broken up from two year grass. The experiment is in all respects a success—a crop of moderate bulk of medium-sized tubers only has been secured, all of which boil to perfection, wherefrom it is inferred that "flavour"—so far as Potatos are concerned—is to be found in a thin crop, planted with wide intervals on a dry "red soil," uncontaminated by strong manures.—*A. P., in The Field.*

LETTUCE GROWING: A THING WORTH KNOWING.

TO THE EDITOR OF THE "PIONEER."

Sir,—In the Lucknow Horticultural Garden is grown an acclimatised cos lettuce, with a selected pedigree of upwards of 15 years. No newly-imported kinds come up to it, as far as suitability to this climate is concerned, yet it is hardly known beyond the sphere of official reports. It is a large and tall cos variety; the tips of the leaves cabbage or fold over each other, so as to blanch the inner leaves without the bother of swathing. Please note what those who have tried it have said about it. Some years back a trial of the Lucknow cos lettuce seed was made at the Saharunpore Botanic Garden, which resulted in the following report:—"A splendid variety; three sowings were made, and all made heads superior to any imported variety we had. Enquiries were made by parties who received it in *dalees*, where the seeds were obtained from." (1) In 1883 I sowed some seeds of this superb cos lettuce in Etawah, and sent some heads of it to friends. They said they never saw anything like it for size, whiteness, sweetness, and crispness. Last year I grew it again. I sent a few heads of it to a lady who had come to Etawah. She said she never saw anything so good. On returning to Agra she asked me to send her some heads of this lettuce, that she might show the residents of Agra what fine lettuce ought to be like in India. Later on she did not forget to write for some of its seed. Now there is a little secret about growing lettuce for *seed*, which may not be generally known, and which the sooner it is learnt the more easily will the grower be able to improve his seed for future sowings. First, always get hold of the best acclimatized strain possible. Second, sow the seed, *not too thickly*, in

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well-prepared beds of rich soil, in October (in the N. W. P. and Oudh)" Third, when big enough to handle, prick out the young plants carefully, 12 or 14 inches apart, in rich soil of the best quality, where they can get plenty of air and sun. Water at once with a rose, and then irrigate the beds regularly at intervals and watch the result. The growing lettuce should never want water, that is, it should never be checked in growing; being a leaf vegetable, it should have the richest possible soil. Of course weeding and other culture must be attended to. *Choola* ashes appear to suit lettuce, but of course it is possible to give too much of a good thing. When the heads are coming on towards being fit for the table you will find that most of them will fold the tips of their inner leaves one over the other, that is, they *cabbage*. *These* are the ones you should select for seed. Do not fancy for a moment, however, that you lose the heads for the table by keeping seed from these plants. Not a bit. When the head is ready for use, *cut it off* close to the ground, leaving only three or four leaves on the stump. Plunge the head in clean fresh water at once, and use it afterwards as required for salad. Within a week or so you will see little sprouts coming up from the stump. These are the *side shoots* of the lettuce, and it is *from these only* that good seed for the next generation can be obtained, that is, if you wish to have lettuce that will grow slowly and cabbage, and will not "run off into flower like rockets." Please note also the following:—Any lettuce heads which do *not* cabbage and remain open like endive, take up scrupulously *by the roots* and do what you like with them. This you must see done yourself, as your mali will not do it, but will leave the stumps of the open-headed lettuces *also* in the ground, the shoots of which would seed like the rest and leaven and spoil your stock with lettuces fit only for cows and goats. The stumps with their flowering stems should be irrigated regularly as before until you gather all the seed you want. Remember the seeds, when ripe, are attached to little tufts of cotton, and will be soon blown away anywhere after expanding. They should therefore be collected daily, after the sun has dried off any dew. A second selection may be made while the flower stems are growing. The fewer stems you leave on each stump, the more nourishment will they get and the stronger will the seed ultimately be. The stumps of the earliest heads taken off *cæteris paribus* are likely to give better seed than the latest. The former will have a good bit of the cold weather to grow and perfect themselves in, while the latter will have the beginning of the hot weather to do it in. Yet a third selection may be made. By winnowing the seed, after cleaning it, in a gentle breeze, over an extended sheet, you will be able to separate the plumpest, and therefore the soundest and heaviest seeds from the chaffy, light ones; the former is what you should keep for stock. If you follow this advice strictly, and see to it now and again yourself, you will not be disappointed with your acclimatised seed. Moreover, by growing already acclimatised seed and keeping your own every year, this lettuce will adapt itself, with a little intelligent modification in the treatment, to all the climates of the N., S., E., W., and centre of India. One word more about the seed. As it would be useless to go to war without keeping your powder dry, so would it be useless to take all the foregoing trouble about nursing and selecting if, after all, you do *not keep your seed dry*. Bottles, well corked, or tin boxes with tightly fitting covers—never too full—are the best for keeping seeds in. Take advantage of dry bright *sunny* days to air and sun your seeds on a blanket spread on a charpoy (not on the ground), with a boy to watch the squirrels. Now there is a reason for most things in this world, and the reason why the side shoots of the lettuce plant are better than the main shoots for keeping seeds from in India is this: the main stem tends to shoot up *quickly*, and its seeds will produce plants with the *same* tendency. Therefore lettuces from the main stem seeds would disappoint you by flying off like rockets into flowering stems before you would have time to consume them, and on the slightest provocation from warm weather and dryness at the root, while your object should be to make them grow slowly, and have them fit for the table throughout a longer period. This you can bring about by keeping seeds from the side shoots only, which will give plants that will grow more slowly. Remember that the winter in India is very short; no sooner are you rid of the rains and their hot-house atmosphere than the coldest part of the winter is upon you (when most vegetables are at their best), and the next warm weather soon following up Curiously enough, natives do not care about lettuce, although they who are fond of eating raw vegetables might eat the raw blanched and sweet leaves with advantage, especially if they first dipped them in lemon juice and then in salt. I use this fine cos lettuce, however, every winter for prisoners, while I keep the stumps of the prime ones for seed. In the prison lettuces are chopped up and boiled as other vegetables, and a fine thing they make when properly done up. For soldiers nothing could be better than this fine vegetable. Last of all it is not impossible that this lettuce grown largely without much richness of soil would yield an opium called *Lactucarium*, which is useful in medicine. It is collected from incisions in the flower stalk, and the root is said to yield an extract which is stronger than that made from the leaves. The medicinal properties of *Lactucarium*, or the extract, are said to be sedative, narcotic, gently laxative, and powerfully diuretic. Whether the cultivated kind can be made to yield this apparently useful drug is, however, a matter for experiment.—E. Bonavia, M D.

FLORAL GRIEF.

Funeral reformers are just now awakening to the conviction that the present fashion of smothering the coffins of our dead with costly wreaths, crosses, and other floral devices is developing into a serious evil, and altogether the reverse of reform or of any regard for simplicity, purity, and refinement If we were writing solely in the interest of flower-growers and wreath-makers, we might exclaim the more of this sort of thing the better for the trade, because it does but bring grist to the flower-grower's mill. It is, however, very difficult to see in what way true horticulture can be benefited by any continuation of a practice which must of necessity be fitful, and associated only with the most nervous forms of sensationalism. It may be well to banish from funerals the lugubrious and costly cortege, the feathers and sashes, and the mutes and other official aspects of mourning, because not only is all this kind of thing very costly, and a tremendous infliction upon those left behind, but it is, after all, but an exhibition of pride and vanity of the most depraved kind, for it is but an attempt to show to the world that grief, which is not deep and sorrow that is not poignant, can find no other solace than in this attractive way.

From grave to gay seems, however, to be as easy a leap as from lively to severe; hence there is now seen a reaction from the masquerade in doleful black to one hardly less meritorious in glass and gilded panoplys, with exposed coffins' yet smothered in floral devices, and thus pride and vanity are still as much gratified and appeased now, in these so-called days of funeral neatness and reform, as when the nodding feathers, solemn mutes, and lugubrious processions held sway. It is not a matter for surprise, therefore, to find that some who really have at heart the purifying and simplifying of our funeral fashions—for, after all, these ceremonies are but fashions—should feel alarmed at the progress of the new state of things, and perceive that costliness may exhibit itself in wealth of floral wreaths and crosses, and vanity be as amply gratified now as in days gone by. Even growers of flowers for the purpose may well feel some alarm at the development thus shown, because they must realise that such fashions are insincere, sensational, and sickly, and may at any moment collapse.

It really is well worth the consideration of funeral reformers, whether the association of show or ceremony with the disposal of our dead is not a great mistake after all, and that when all that is mortal is returned to its mother earth, it should not be performed with quietness and despatch. In one respect the association of flowers with funerals have one terrible significance, which few seem to realise—they so soon fade and die. Their beauty and sweetness is, when thus employed, so evanescent, they may well serve to show those who are yet left behind that mortal life is very fleeting, that the flesh of all human kind, rich or poor, is but as grass, and that it soon withers and dies. If there is one place more than another at which proud human nature should feel humbled, it is at the grave-side, when we are brought face to face with the terrible fact, that whatsoever may have been in life our social distinctions or differences, death levels all; and even the body borne to the grave under a mountain of costly wreaths and crosses of flowers reverts to the same substance as do that one on whom not a flower has been laid or a tear shed. There will presently come a revulsion of feeling from wreaths and other floral designs, which constitute

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upon the living a tax such as is becoming unbearable, and the sooner our growers realise that such a change is inevitable the better for them.—*Gardening World.*

PURIFICATION OF DRINKING WATER.

EDWIN J. HOWE, M. D.

The average healthy adult man takes into his system four and a half pounds of water daily, and with it too often a dangerous quantity of foreign matter and disease-producing germs. In very many homes during the summer months, water that otherwise would nauseate the drinker, is made cold by ice, and then is hastily swallowed, the coldness masking its offensiveness. Unfortunately for the health of the consumer, the addition of ice does not render the impurities in water innocuous, but often adds to it its own contribution of disease-germs. Those who have studied the subject are aware that impure drinking water is the cause of many of the most common diseases. No subject then is of greater importance to the public than how to purify our drinking water. Water, if drawn through lead and tin pipes, often becomes contaminated with these metals to a dangerous extent. Where water remains in a lead pipe for twenty-four hours, and is then drawn off and drank, there is always danger of lead poisoning. It is always safer to let the water run for several minutes before using any for drinking purposes. Boiling the water destroys some germs, but does not remove impurities in solution. Analyses of water from city wells have frequently shown it to be so impure as to be utterly unfit for drinking purposes, and dangerous to health. The use of rain water caught in cisterns, with suitable precautions, will obviate most dangers from the present supplies of many cities, but unfortunately, few persons can take these "suitable precautions." A clean roof to collect the rain, clean pipe to transport, and a clean, well ventilated cistern to receive it, are essential. Water stored in a close cistern soon becomes unfit for use. Many waters that appear clear are full of impurities, and dangerous to health. Dr. Ezra Hunt says: "There are many waters used for drinking, which, if kept a few days in a long glass tube, half full and corked, will, on opening, emit much odour from the change in the suspended or dissolved ingredients they contain." The large majority of people in cities must depend for water on the public supply, hence it is of the utmost importance to the public health that the purest water attainable be secured; this, unfortunately, is often very impure. The only safe-guard to the consumer is in giving his personal attention to the filtration of the water used in his household. Water slowly percolated through crushed vegetable charcoal will escape from it not only cleansed of particles held in suspension, but also of organic and other matter. The cheapness of charcoal is such that it is obtainable by all classes, and when soiled, a fresh quantity can be substituted at trifling cost. The most effective filtration is obtained by placing crushed charcoal in an earthen vessel, so arranged as to compel the slow passage of the water through it, as all efforts at rapid filtration have proved inefficient. Only wooden spigots should be used in drawing of the water. A reservoir for the filtered water with a separate ice chamber, will permit the water to be sufficiently chilled and keep all ice impurities out. Such a contrivance requires but very little room, is easily cleaned, the coal renewed, and is efficient in freeing water from impurities.

[The fact that ice may preserve disease germs was painfully proved by the terrible epidemic of typhoid fever which overtook the village of Plymouth in Pennsylvania in the spring. The dejections of a typhoid patient were thrown out upon the snow, near a brook, last winter. The snow preserved the germs, and melted; the brook carried them to a storage lake or reservoir, whence the water was distributed to the village. Families were swept away, and hundreds of people died.—EDS.]—*American Agriculturist.*

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Editorial Article.

HORTICULTURE *versus* BOTANY.

BOTANY and Horticulture are so closely allied in some respects, and in others their interests are so divergent, that it is not too much to say that the Botanist is at the same time the best friend and the worst enemy that the horticulturist possesses. This apparent paradox may require explanation, and it can be explained in a few words. Botany has rendered horticulture an immense service by reducing into something like order the chaos that originally existed in the classification of the inhabitants of the vegetable kingdom, and this has no doubt proved of much practical value to horticulture generally, but more especially to those further advanced in the art ; but here we must stop. This same classification, so simple to the initiated, proves a veritable bugbear to those who have perhaps neither the time nor inclination to fathom its hidden mysteries, and amongst this order we may class the majority of the large body of amateur gardeners. The battle of science *versus* practice has been long and stubbornly fought without either side gaining much advantage. Botanists are accused of possessing little sympathy with their brethren of the spade, and the latter are supposed to value too lightly the arduous and enlightened labours of the former. Be this as it may, there is no doubting the fact that each is very well in its place, and that when the two are combined the one heightens the value of the other.

There is however no questioning the fact that Botany as a science has been brought too prominently forward by its general introduction into the curriculum of our universities and colleges, and this is especially noticeable in this country. Amongst the thousands of candidates that annually appear in the B. A. and M. A. courses at the Calcutta University, in which Botany is, we believe, a compulsory subject, it is questionable if there is amongst them one student who has gained anything more than a superficial knowledge of the science, and why ? simply because every one knows that the knowledge acquired is scarcely likely to prove of any practical advantage in after life. The Government of India is necessarily a conservative one—radical changes of any description must be introduced with caution, but we think that the change referred to in the following paragraph which recently appeared in the *Statesman*, is a move in the right direction :—

" We note with pleasure that the Madras Government has decided to substitute horticulture for botany in the higher examinations in science and art. For the preliminary examination, a 'syllabus' comprises the structure and growth of plants, soils, manures, tillage operations, horticultural operations, and horticultural implements. In addition to pass papers, there will be a *viva voce* examination in the above subjects. This new departure will be an

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incentive to the study of a science, which has hitherto, in this country, been confined to the few who have the time and means to pursue it. Efforts ought at no distant date to be made for the granting of a degree to candidates who take the highest honours. At present an Indian horticulturist has no *locus standi*, whereas his English contemporary, by having the letters F.L.S. (Fellow of the Linnean Society), and F.R.H.S. (Fellow of the Royal Horticultural Society) affixed to his name, carries the 'hall mark' of efficiency in his profession. Again, whenever the Government of India requires a curator or gardener for any of the Government botanical gardens or plantations, a man has to be got out from England at great expense, and under a covenant of three to five years. By establishing a degree in horticulture in India, this expense and inconvenience will be done away with. No Englishman can be expected to know the language of this country, or the conditions of plant life in India. Another advantage of the system will be the encouragement to study a science that has long been neglected in India, and the supply of thoroughly trained gardeners, and it is a matter of surprise that a step in this direction was not taken long since."

And this is from the benighted presidency. We can only hope that it is but the thin end of the wedge, and that not only will the other Presidencies follow the example, but also that the ball once set rolling in the right direction it will eventually end in horticulture becoming a standard subject in every English or Vernacular school in the country. This has now become an accomplished fact in almost every country in Europe with the excetion of England. The public school law passed in Austria in 1869 provides that "in every school a gymnastic ground, a garden for the teacher, according to the circumstances of the community, and a place for the purposes of agricultural experiment be created." The school inspectors of each district are instructed "to see to it that in the country schools school-gardens shall be provided for instruction in all that relates to the soil, and that the teacher shall make himself skilful in such instruction." The general law declares "instruction in natural history is indispensable to suitably-established school-gardens. The teachers must therefore be in a condition to conduct them.

The German word "Kindergarten," as well as the method of instructing quite young children associated with it, is already tolerably familiar in this country. Briefly it is an institution to assist in and complete the bringing up of children, who are yet too young (three to six years of age) for regular school duties. True, it may include among its devices a small garden to promote observation and industry in its infant wards; but the school garden, as understood in Austria, is a real garden attached to the school, and forming part of the school. An article on this subject by E. Schwab, entitled "Der gegenwärtige Stand der Sache des Schulgartens," has recently appeared in the *Neue Freie Press*, and is translated in the *Gardeners' Chronicle*. In this article the writer, who it would seem is an enthusiastic promoter of this scheme for imparting practical instruction, gives us his ideas on the uses and scope of the school garden. This is an institution of Austrian origin, and it is rapidly extending from country to country of that large empire. Thus in a small district of Silesia 245 schools have gardens attached, thirty-six of which are worthy of notice, and of recent date. Many of the older ones are undergoing judicious remodelling, and six new ones are in the course of foundation. Moravia and Bohemia are active in the movement, and Galicia already possesses a considerable number in some of the provinces. In a few years the provinces of Mielec and Jaroslav will be dotted all over with school gardens, each one including a neat little ornamental garden. In Steyermark, again, a great many have been formed, and no fewer than forty-two through the exertions of the Agricultural Society. In the capital little has yet been done in the matter, but recently the Common Council has resolved that they should be established wherever the requisite space can be obtained. Seeds are supplied from the national botanic gardens, and a worthy gentleman, Max Machanak, furnishes beautifully executed and suitable plans to any parish wishing to introduce the system, out of pure philanthropy. The writer deprecates the plan of making simply useful gardens, and would have them include recreation grounds as well as ornamental features. In fact, with due regard to economy, the garden should be laid out with discernment and taste, in order to instil into the minds of the young scholars a sense of the beautiful. If instituted simply for the purpose of inculcating early habits of industry, it would doubtless prove a failure. Of course the design and arrangements should always be made subordinate to local conditions and circumstances. Thus in a large town the requirements and the space generally available are usually widely diverse from those obtaining in a small country town. Again the class of school and the sex of the scholars have to be taken into account, as well as the resources of the establishment in question. The scheme is practicable in all national schools, schools for training teachers, orphan asylums, educational institutions for deaf mutes, weak-minded persons, &c. In all cases the natural capabilities—as extent, situation, shape of the ground, and quality of the soil, must be carefully studied. In short, no uniform plan can be carried out, for the conditions of a fertile plain are widely diverse from those of a barren mountain valley, and the same may be said of different altitudes. But even under the most unfavourable circumstances, the indigenous vegetation of the district should be illustrated, as well as the cultivated cereals, fodder plants, aromatic and medicinal herbs, vegetables and herbs employed in cookery, and fruit of all kinds. The poisonous plants, particularly of the neighourhood, should be cultivated in order to make them familiar to the scholars, and any plants peculiar to the region, and so on. Ornamental shrubs and herbaceous plants also deserve attention where there is room for them, and in larger gardens representatives of the native forest trees should be placed for shade on the play-ground and gymnasium. Where there is water, if only an ordinary spring, the school garden may be made a place of charming beauty; and thus formed, according to the space at command, it offers children the facilities for observation, and is a rich source of pure delight. Moreover, the knowledge gained by children in this practical manner—and in a well-conducted garden it is varied and valuable—is permanent; they may forget what they learn, but not what they experience. This, and much more, the writer says in favour of the school garden. One of the principal advantages of this system, besides affording pure and healthy occupation and pleasure, is, that under proper tuition, it induces habits of obsevation and independent thought. Again, in towns it keeps

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children both from the evil influences of the streets, or those more inclined for study from shutting themselves up too closely instead of taking healthy exercise. Qualified teachers speak very highly of the aid afforded in general education by the school garden, as well as of its elevating influences on the minds of the children. But it should be remembered that the school garden is not an entirely new idea. For more than a hundred years energetic schoolmasters have been trying to carry out the idea, but, simple as it is, they have not got beyond theory, having stuck fast in their search for a model which should be of universal application. In 1871 Sweden, with its 7528 free schools or national schools, possessed 2000 school gardens; but these were all in country places, and only kept up for certain practical purposes. At the Universal Exhibition of Vienna. Austria gave her contemporaries an example of a moderately large country school garden, actually laid out and planted, showing how easily, and at a proportionately small cost, a school garden may be carried out.

It is evidently only a question of time for a similar system to be introduced into England, for public opinion is already prepossessed in its favor. The *Gardeners' Chronicle*, in a recent article on the subject, makes the following pithy remarks :—

"Practical cultivation by what we may call the rule-of-thumb, is as perfect as it well can be. It is difficult to imagine anything better in its way than the practice of an experienced and intelligent first-class farmer or gardener. It is hardly likely much further progress can be made in this direction. New ground must be broken, fresh experience sought and obtained. Masters and men must be more thoroughly educated, more carefully trained; and the education and the training must be special. Given a common basis in the shape of a good general education, there must be added to that a special training in natural science—the knowledge of the forms, structure, and manners of living creatures—knowledge of the powers and capabilities of the air, the soil, and the waters and their inhabitants—knowledge of physics and of chemistry. By these means, and these only, as we believe, shall we be able to break out from our old routine into fresh fields and pastures new. In the field of practical horticulture, to take a single illustration, there is no one thing more promising of good results in the future than is the application of the electric light for forcing purposes; but out of the thousands of employers, and the tens of thousands of workmen, what an infinitesimal proportion know anything whatever of the mode of action of electricity. Again, of what avail are the labours of practical entomologists and practical students of fungus pests if cultivators are not educated sufficiently to turn them to good account? The investigations, for instance, into the nature of the Potato disease are at least amply sufficient to afford valuable lessons to the grower as to what means are in his power to mitigate the disasters to which he is subject, but has he availed himself of them?—does he show any inclination to do so? We fear not.

A thoroughly good practitioner of the present day is in himself no better than many of his predecessors. He is better because he has means and appliances which they had not; but, taking the two men, irrespective of their surroundings, the man of the nineteenth century is no better than his predecessor. This should not be. It is contrary to Nature's law of progress. It is the surest indication of the operation of that other law of Nature—the law of progressive deterioration and ultimate extinction. To promote the onward and prevent the downward progress in agriculture and gardening, the most efficacious means, so far as we know, are to be sought in the study of natural and physical science in all its branches, and its application to the business of life.

"'Does it not seem extraordinary' (says Sir John Lubbock,) "that in such a country as ours there should be only one school devoted to agriculture; that we should have no forest school, so that the young men who are going to be placed in charge of our great Indian forests have to learn their business in France or Germany; that no instruction is given in agricultural matters in any of the schools and colleges to which our landed proprietors send their sons; and that the education code practically excludes all elementary instruction in the processes of agriculture, the nature of soils, or the care of domestic animals, from our country village schools?'

"It does, indeed, seem extraordinary, seeing that we call ourselves a practical people! Of such and similar institutions America boasts scores, Germany has them in abundance, France has them. Belgium makes them portions of her University *curriculum*. France has quite recently established a Chair of Vegetable Physiology at the Jardin des Plantes. The countries we have named are right, and we are wrong. We are tamely letting them get the better of us, and complaining of bad seasons and hard laws, all the time doing next to nothing to meet the altered circumstances. The village school should furnish the basis, not only of a common education, but also such a knowledge of the soil, the air, the waters, the plants and the animals as may be made available in the daily routine of the farm or the garden. We cannot too emphatically repeat our conviction, that progress in gardening and farming in the future depends far more on the results to be got from a thorough training in the various branches of natural knowledge, than it does in any readjustment of land laws or lightening of fiscal regulations. These are, as it were, local accidents—limited in their area, restricted in their range, but Nature is universal, the application of a knowledge of her laws to the business of life is limited only by the finite faculties of man."

But the other day we learnt from one of the Government Inspectors of Schools that one of the schools under his examination had a master who taught the boys elementary gardening, being himself an enthusiastic amateur gardener; "and," said the Inspector, "this is one of the best schools in my district." Of course it is not to be assumed that this increased intelligence grew solely out of the gardening teaching; the same results would no doubt have followed from the teaching of any other trade or vocation, simply because the half hour now and then devoted to such work becomes not only relaxation from mental studies, but acts on a diverse set of intellectual organs, thus recreating yet instructing. It is the exceeding monotony of our present mode of inculcating knowledge that turns so many fairly intelligent children into dullards. Objects of any kind used in teaching, must exercise the same influence that pictures do,—they bring nearly all the brain organs into equal play, and the risible as well as the intellectual organs are often equally excited. Put in this way much might be done in imparting a knowledge of plants, fruit, seeds, insects, vermin, birds and

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myriads of things that it would be of real value they should know something about, and especially those whose vocation in after-life may be associated with the soil. A portion of the time spent in elementary schools on such subjects as grammar and history, drawing, electricity, or whatever subject the taste or whim of the teacher may lead him to take up, might be more profitably employed in showing the future agriculturist or horticulturist that his work demands the exercise of intelligence and skill, and that the application of these qualities would certainly make his services more valuable. The very fact that is admitted on all hands that the most intelligent inhabitants of rural districts invariably look townwards, or to other employments for more profitable occupation, shows that there is something about their training and circumstances radically wrong. Is the school garden worth thinking about—worth trying? Some time perhaps before this century has closed, the vast overgrown centres of manufacturing industry will begin to feel the pressure of foreign competition, to say nothing of the exchange question, and an anxious legislature will awake to the consciousness that there are millions of acres actually barren that could be brought under cultivation, and that even the land under cultivation might be brought to yield twice as much as it does at present through more sensible and thorough cultivation. It is a lamentable fact that in a country so well adapted for vegetable culture as India is, one half the population never get anything beyond what may be termed weeds found in an uncultivated state, and even possessors of gardens have but little knowledge as to how good vegetables should be grown. Natives, as a rule, plod on year after year, growing what their ancestors grew; they seldom get a word of advice in a plain practical manner as to what is good or what is bad in the way of either plants, vegetable or fruit.

Editorial Notes.

THE growths of Corn and Potatoes of the United Kingdom are worth on an average over one hundred millions sterling per annum.

WOODLICE seek dry shelter, and may be readily entrapped by laying flower-pots on their sides, containing a wisp of hay or straw and some pieces of boiled potato as a bait. Every morning they should be emptied out and destroyed. Toads too are capital aids in freeing plant-houses from these pests, but they cannot be expected to effect a quick clearance.

THE Brazilian nut tree, a native of the country the name of which it bears, grows to an average height of seventy-five feet. The fruit resembles a cocoa-nut, and is about a third larger. Each ball contains from twelve to twenty nuts, three-cornered in shape and nicely packed together. During the season of their falling it is dangerous to enter the forest without a shield, as the force of their descent is sufficient to knock down the strongest man.

APPLES.—It is stated that by a careful anslysis it has been found that Apples contain a larger amount of phosphorus, or brain food, than any other fruit or vegetable, and on this account they are very important to sedentary men who work with their brain rather than muscles. They also contain the acids which are needed every day, especially for sedentary men, the action of whose liver is sluggish, to eliminate effete matters, which, if retained in the system, produce inaction of the brain, and indeed of the whole system, causing jaundice, sleepiness, scurvy, and troublesome disease of the skin.

FRUIT v. MALARIA.—Residents in the Western States of America, and other regions where intermittents and similar diseases result from malaria, state that a regular supply of ripe, home-grown fruit is almost a preventive. Eat the fruit only when fully ripe, and only moderate quantities at a time. Good hardy fruits, and of kinds that bear early and are fertile, should be planted out on every new place, as indispensable to health as well as to comfort and economy, and emigrants to new countries should take a supply with them, as the best medicine chest they can provide.

QUEER NAMES.—A correspondent says:—"It is amusing how plants get queer names. 'Joseph on the palings' for Josephine de Malines Pear reminds me of a joke of a similar kind. Recently a lady friend going through my garden asked a name which I told her was a kind of Lythrum. I was surprised some days afterwards to be told that the 'Bed-room' plant I had called her attention to was certainly a beautiful thing. She wished me to note by this reference that she had remembered the name."—*Gardener's Monthly.*

A POLICE FORCE OF ANTS.—A queer way of employing ants is reported by an English gentleman who has been travelling through one of the provinces of China. It appears that, in many parts of the province of Canton, the orange-trees are infested by worms; and, to rid themselves of these pests, the natives bring ants into the orangeries from the neighboring hills. The ants are trapped by holding the mouth of a lard bladder to their nests. They are then placed among the branches of the orange-trees, where they form colonies; and bamboo rods are laid from tree to tree, to enable the ants to move throughout the orangery.—*Popular Science News.*

NATIVE CALIFORNIAN TOBACCO.—Prof. Rothrock is of opinion that the early natives of California smoked the leaves of Nicotiana Clevelandii, A. Gray—a species only quite recently described. It is a small plant with small flowers, and it was found by Prof. Rothrock only in association with the shell heaps which occur so abundantly on the coasts of Southern and Central California. He states that perhaps of all the remains of extinct races so richly furnished by that region, none were so common as the pipes, usually made of stone resembling serpentine. The Tobacco of N. Clevelandii Prof. Rothrock found by experience to be excessively strong.

ADULTERATED PLANT-SEED.—Even plant-seeds are sometimes considerably adulterated. It has been proved, says a German paper, that clover and lucerne are often mixed with small artificially prepared and coloured quartz stones. For the production of these quartz granules there are special manufactories, which accomplish their task so well that even a practised eye would have difficulty in detecting the fraud. Old seeds also are coloured, sulphurised, oiled, and treated with various substances which produce a fresher and better appearance, and are often even mixed to a considerable extent with old seed no longer capable of germination. The question of a system of seed-inspection is being greatly ventilated.

RUST ON TOOLS.—The *Farmers' Advocate* says there are several easy ways to prevent rusting of ploughs and cultivators, and to keep the teeth bright. One is to give them a coat of thick limewash as soon as they are brought in from the field; another is to dissolve an ounce of rosin in four ounces of linseed oil, and while hot mix this with a quart of kerosene and stir well. This is laid on to smooth iron with a paint brush. Another way is to dissolve an

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ounce of camphor in some turpentine and add this to four ounces of lard and one ounce of pulverized blacklead or stove polish, and mix well. This may be rubbed on with a rag. To remove rust from ploughs or tools nothing is better than a mixture of a half pint of oil of vitriol poured slowly into a quart of water, and apply this to the rusted metal. Wash off with water.—*Florida Dispatch.*

Ascent of the Sap in Trees.—M. Böhm's theory offers perhaps a more satisfactory explanation of this phenomenon than any that have hitherto been published. It is based, like the osmotic theory, on the cellular structure of all sap-conducting plants, and it attributes an important *role* to the elasticity of the cells. "When the surface-cells of a plant," says M. Böhm, "have lost a portion of their water through evaporation, they are somewhat compressed by the air-pressure. Like elastic bladders, however, they tend to take their original form. This of course is only possible by their drawing in either air or water from without. Since, however, moist membranes are little penetrable by air, the cells draw from cells further in a portion of their liquid contents. These again borrow from their neighbours further down, which contain more water, and so on, either to the extreme root-cells, or to those parts of the stem which are supplied with water from below through root-pressure.

An Ancient Oak Tree.—The following particulars concerning an old Oak tree just dug up at Burley will be read with interest. A day or two ago some workmen digging a trench on a roadside, opposite the Cardigan Arms, cut through several feet of black earth, thickly mixed with rolled and rounded sandstones, and then coming upon alluvial earth, struck at a depth of 15 ft. on a very long trunk of Oak, 8 ft. 9 in. in general girth, and of about the same girth throughout, from which they sawed out a length of 20 ft. The whole of the tree has, however, since been dug up, and it has been bought by Messrs. Hummerston, East Parade, Leeds. The dimensions of this Oak may be judged from the fact that it weighs 4 tons, and had to be cross-cut before being removed to the saw-mill. In colour it is of an ebony black, and the wood is sound throughout, though of course very wet, having been buried in the earth, it is conjectured, at least 200 years.

The Cause of Landslips.—The fall of hill masses is a phenomenon not uncommon in Switzerland. The nature of such catastrophes is investigated in a small work recently published by Dr. Britzer. He distinguishes in every such fall three regions—the place of origin, the cause of the rushing mass, and the region of deposition. Most of the phenomena are due to the softening of impermeable marl, clay, or clayey rocks, in whose layers the water stagnates. The mass is gradually loosened and loses its hold. Fissures first arise, as certain pieces of the surface break away before others. When the last attachments are sundered the mass slides down (like a ship from the stocks) on the slippery underlayer, or tumbles over, breaking into pieces. There are frequently, however, falls of greatly inclined masses, without any softened layer being present. The masses have been saturated with water, which has increased their weight, and they glide down over their solid, rocky foundation, simply in consequence of dissolution and increased weight. Further causes are earthquakes and loosening of the rocks through frost. The phenomena still, however, present many problems to the geologist.

Home-grown and Foreign-grown Fruits.—How is it that the Apple cultivators in Canada can compete with the home producer, and not only hold his own, but find his trade increasing? *The Covent Garden Gazette and Market Record* points out that while the advance in Canada is so rapid, "the increase in the same branch at home is so insignificant that one almost wonders if the home grower is not only apathetic, but asleep; or is it true that they are bound hand and foot and cannot move? We fear there is something in this. Unjust land laws and impediments block he agriculturist in every direction when he attempts to move; not the least of these being tithes, which are a disgrace to any enlightened nation. Does the land tiller improve his soil, and by industry and skill force its value up in the market? Then, at the expiration of his time, he must stand by and see the fruits of his hands harvested by another. What the agriculturists want, and must have, is to be placed upon the same footing as his foreign and colonial rival. But till he is free, he is only making the world believe he is a farmer, at the same time that he knows he is simply playing the part. The fact remains that in no country under the sun is fruit culture so hampered as in this country, where it should be most unfettered. The English grower's loss is the foreigner's benefit. Is this just?"—*Gardening World.*

Age of Trees.—The following, taken from a biography of Humboldt in "Worthies of the World," shows to what a remarkable age some trees have attained. This is an interesting subject, and as so very few old trees remain in this country, I think it would be well if a record of these were kept, and perhaps some of your readers who know of such within their experience could make a note of them, stating age and locality as a guide for those who might wish to see them. In speaking of Humboldt's visit to Teneriffe, the writer says: Humboldt and Bonpland took advantage of their short stay at Teneriffe to visit and measure the remarkable Dragon tree of Orotava. Judging by the small increase in the size of this tree, in the course of centuries, and comparing its dimensions with those of the young Dragon trees that surround it, Humboldt assigns to it a vast age. It is just mentioned by the voyagers, the Bethencourts, who visited Teneriffe in 1402, and appears to have been worshipped as a sacred tree by the Guanches, the original inhabitants of the island, as the Ash tree of Ephesus was by the Greeks, the sacred Banyan tree in Ceylon, or the Lydian Plane tree which Xerxes decked with trophies. This visit to the Dragon tree of Orotava was afterwards the occasion of an interesting series of observations on the age of trees. Humboldt says that De Candolle, judging by the rings formed in successive years under the bark of the trunk, assigns to the celebrated Yew tree in the village of Brabourne, in Kent, an age of 3000 years, and the Scotch Yew of Fortingal twenty-five or twenty-six centuries; while the celebrated Rose tree in the ruins of the crypt of the cathedral of Hildesheim, in Germany, has an ascertained age of 1000 years. The cathedral was founded by Louis the Pious, the son and successor of Charlemagne. Louis died in 840; and that this Rose tree was planted at the foundation of the cathedral is attested by a document of the eleventh century, which records how on the rebuilding of the cathedral the Rose tree of good King Louis was preserved, and its branches spread out over the walls of the crypt. At Ripon, in Kent, and Crowhurst, in Surrey, are also trees of an estimated age of from twelve to fourteen centuries.—J. S. T.—*The Garden.*

Original Articles.

BULB GARDENING IN INDIA.

Liliums—*(continued from page 234.)*

Although we have described in detail the proper treatment of Lilies grown in the open ground, we must confess that, except under special conditions, we cannot recommend this system of culture in the plains, although admirably adapted for gardens in the hills. In the first place, under ordinary treatment most of the plants, especially those from imported bulbs, will flower at intervals from March to June, just the hottest period of the year, and when, unless the blooms are carefully protected from the direct rays of the sun, their beauty is very evanescent. Flowering at such a time, the bulbs ripen and the foliage die down just before the rainy season sets in, and consequently the bulbs have to remain all through July, August and September in a thoroughly saturated soil just at a period when they require the least moisture. Is it any wonder if the majority of them succumb under such conditions?

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In our Hill stations, and especially at an elevation of 5,000 to 8,000 feet, the case is very different, imported bulbs planted at the same time as those in the plains start into growth at least a month or two later, and rarely flower before July and continue through August and frequently into September; and although these are perhaps subject to a much heavier rainfall than those growing in the plains, the bulbs being in vigorous growth are enabled to withstand it, the large amount of moisture absorbed being thrown off through the foliage.

Cultivation in Pots.

Having described the disadvantages attending cultivation in the open ground, it is only fair that we should endeavour to explain the many advantages attending pot culture. In the first place, plants in pots are more easily managed, not only during their growing season, but more especially at their resting period, when they can be placed under shelter; secondly, plants in pots may be moved from place to place, and thereby ensure them a suitable position at all stages of growth; thirdly, they are more easily supplied with water, and liquid or other stimulants, and lastly, they are less exposed to the ravages of insects and other pests.

Let us first start with the treatment of imported bulbs. These, if received direct from Japan or California, will arrive here by the end of October; if imported from Europe, rarely before the end of November. Where practicable bulbs should always be procured from the first-mentioned sources, as these invariably arrive in better condition, owing, of course, to the fact that they are taken direct from the soil and shipped at once, and have to endure a comparatively short voyage. Bulbs received from Europe have first to endure a long voyage from their native habitat, frequently an exposure of a month or two, and are shipped to this country. Is it surprising then that many of them arrive too weak to start into growth again? Where bulbs must be obtained from England or the Continent, they should be procured from the most reliable sources, and *home-grown bulbs* stipulated for; these are generally rather more expensive than the bulbs ordinarily sold, but invariably give better results.

Immediately on arrival the bulbs should be carefully examined, and any scales showing the slightest signs of decay, should be removed by cutting them off with a sharp knife directly from the base, the cut parts being at once covered with a little powdered charcoal to insure their healing rapidly. With a small quantity of bulbs only, perhaps the best plan would be to pot them off at once; but where we have a large quantity, and several of each variety, we prefer the following mode of treatment: take ordinary seed pans, twelve or fourteen inches in diameter and at least six inches deep, place a layer of about an inch of coarsely broken charcoal at the bottom, and above this a layer of about the same thickness of cocoa-nut fibre refuse, place the bulbs evenly on this and then fill up with the same material until the bulbs are covered about one-and-a-half inches; after pressing it down firmly, the cocoa-nut fibre should be moderately moistened before being used, and no other water should be given them for at least a week or ten days. Stand the pans in a cool position under cover,—the damp floor of a godown or outhouse answering the purpose admirably provided sufficient light and air are admitted. At the end of about three weeks carefully remove the covering material and examine the bulbs, if they are still dry, and the scales present a shrivelled appearance similar to newly imported bulbs, cover them up again at once and allow them to remain another fortnight, taking care to remove any that show signs of rotting. If the bulbs are plump and the scales thick and fleshy, remove entirely all the cocoa fibre, and carefully remove the bulbs, when it will generally be found that they have commenced to root freely. The earlier the bulbs are potted off at this stage the better, for if these tender roots attain any length they are almost sure to be damaged in the handling, and thereby experience a check from which they rarely recover.

Potting.

The soils best adapted for Lilies have already been described, we will therefore now endeavour to describe the best method of potting them. In the first place, select pots that are deep in proportion to their size; the size of the pots will of course depend on the varieties of Lilies to be grown, as they vary immensely in size of bulbs and plants. As a rule however an 8 in. or 10 in. is sufficiently large for a single bulb, and by continuing to shift the single bulbs with it increase on *en masse* into 12 and then 15 inch pots, grand specimens may in time be obtained. This method however is too slow for the majority of amateur gardeners, who require big specimens to start with Those who follow this doctrine may grow three, five or seven bulbs of such liliums as *Auratum*, *Speciosum*, *longiflorum*, &c., in a 10 in. or 12 in. pot. Those numbers of flowering bulbs will make a magnificent display at once. The finest bulbs should invariably be placed in the centre of the pot; this may be considered a small matter, but much of the ultimate effect depends upon it. The effect of what would otherwise be a grand pot of Lilies, is often entirely spoilt when the centre is occupied by a miserably weak or diseased plant, and the best bulbs spring up against the sides of the pot. This shows careless potting if nothing worse. Having selected the pots, prepared our compost, and got everything in readiness, the first care should be to provied efficient drainage. First place a layer of 1 in. to 1½ in. of broken crocks, the largest below and the smaller above, then give about an inch of coarse charcoal; this must be covered with a layer of the roughest portion of the soil to prevent the finer parts running down between the potsherds and charcoal. After filling in altogether about 3 inches of compost, the bulbs should be planted. If these are already started, the roots should be spread out evenly over the surface, fill up around and among them, pressing the soil in pretty firmly, finishing off with about two inches of soil over the crown of the bulbs. At least two to three inches must be left between the surface of the soil and the top of the pots. This is done for the following reason. Those who have given any attention to the growth of Liliums, must have observed the quantity of young fleshy roots that most of them produce from the base of the flower stem and above the bulb, and to the full development of these roots special attention should be directed. Therefore, as soon as the shoots are a moderate height, and have become pretty firm, fill up the pot to the rim with a similar compost to that used for potting, with the addition of some old manure. This will give the plants an efficient top-dressing, and the stem roots will speedily strike into it and greatly assist in the development of plentiful and large flowers. One of the principal points in the culture of most Liliums is to develop the stem roots—a point too often entirely lost sight of.

After potting they should be kept in a cool, shady position, and receive no water for the first few days, and then only just sufficient to keep the soil in a moderately moist condition until they show signs of growth and the stems appear, when they should get plenty of water and abundance of air and light. Most Lilies are gross feeders, especially those of the *auratum* type, and require during their growing season plenty of moisture; in fact if the pots be drained as advised they can scarcely be over-watered.

When the plants are about a foot high supply each with a light well pointed stake, taking care not to damage the bulbs or the roots in the operation. On no account put the stake between the soil and the pot, as the roots generally work themselves into masses against the inner wall of their pots. As to feeding, weak guano water may be given with safety after the plants have arrived at a vigorous growth, twice a week; unless in dull weather, when less water will be required, and from the time they branch at the top they may receive it without intermission on to the time the first flowers have expanded; but at all times be especially careful not to splash the leaves while watering with it, as it will be sure to spot them brown. Attend throughout to tying as the stems progress upwards, turning the pots round occasionally to ensure their retaining a good shape, for nothing looks worse than one-sided plants, especially those grown in pots. Syringe the foliage regularly each evening until the flower buds show signs of changing from a green to their natural colour; as soon as the last flower buds have expanded gradually withhold water till the blooms are spent, when water must be entirely discoutinued and the plants placed in a cool shaded spot, there to rest till called out into new life the following season. The soil however must not be allowed to become dust dry during the resting period, water therefore must be given at intervals to maintain the soil in a nice moist condition. This point is the stumbling-block that has probably caused more failures in Lily culture than any other. There is a popular

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notion that bulbs cannot be injured by extreme drought, or even by exposure to the sun and air for a length of time; and as far as bulbs of the type of the Gladiolus, Hyacinth and Tulip are concerned, the notion is well enough founded; but with bulbs of a scaly nature, of which those of the Lily are the type, it is different, for they suffer very much indeed by great and continued exposure, and hence the frequent failures with imported bulbs, many of which, beside having to withstand the effects of a long voyage, had perhaps been badly stored or suffered from a lengthened exposure before being shipped.

Second Years' Treatment.

Although imported bulbs may be flowered very successfully the first season, still it is not till the second, and frequently the third year, that we may anticipate a full measure of success, that is, if the bulbs receive the after treatment essential to their well-being. Many of the most experienced English growers of this beautiful family recommend that the bulbs should be repotted immediately after the completion of the season's growth and full maturation of the bulbs, and undoubtedly, in a cool climate, this treatment is the best, but in the plains it should never be attempted. In a cold climate bulbs may be potted for weeks and frequently months before they make any signs of growth, that is, unless they are placed in artificial heat. Here, on the contrary, few species of bulbs rarely become entirely dormant, or if they do, it is for a very brief period as compared with that under other conditions; consequently to repot Lilies immediately after the foliage dies down, would only induce them to start feebly into growth again, and eventually perish.

Our experience is this: after the plants have flowered, give them sufficient water to maintain the foliage in vigorous health as long as possible, when, however, the leaves commence to turn yellow, gradually withhold it. The process of maturity may be heightened and intensified as long as there is a green leaf or growing stem on Lilies, but after this the bulbs must be left to themselves. Cut down or remove all the old stems and lay the pots on their sides in the open air for a week or two, but before the commencement of the rains remove them to safe quarters under cover; during the rains see that the soil does not become too dry, a sprinkling once a fortnight will generally be sufficient to enable the bulbs to remain plump and solid.

About the middle of September they should be repotted, using the compost previously mentioned. In performing the operation, disturb the old ball of earth as little as possible, using pots one or two sizes larger than they were growing in previously. After this water must be sparingly given until they show signs of growth, when it must be liberally applied; the after treatment being then the same as for newly imported bulbs.

During the third or fourth season the plants will generally have become so large as to compel their roots being separated: there are two methods of doing this, the first, and certainly the best, is as follows. Turn the ball of earth entirely out of the pot, reducing it sufficiently so as to expose each bulb or cluster of bulbs, so that each may be separated with its bulbs and roots entire, and place in a fresh pot with new earth. Thus if there were five bulbs in the old pot, there would be five patches in the new, the roots of each being kept intact. By this means the plants receive but little check, there not being sufficient disturbance to hinder the completion of maturity or the manufacture of new roots.

The other method, and the one which is generally adopted for trade purposes, involves the disturbance of the whole of the bulbs and the injury and destruction of many of the roots. It has, however, the obvious advantage of giving the bulbs a fresh start in entirely new soil, enables the grower to sort and arrange them according to size, and undoubtedly, with most species, hastens the increase of bulbs: on the other hand it seems to check flowering in many species, arrests the continuous growth of roots, and thus check the enlargement of the bulbs.

In our next issue we shall give a descriptive list of the members of this beautiful family, pointing out those best adapted for cultivation in this country.

LAYERING TREES AND SHRUBS.

Layering may be described as perhaps the most primitive mode of artificially increasing the stock of any shrub or tree, and was probably for long the only way known of perpetuating such desirable varieties as did not come true from seeds. It is simply the art of rooting a branch while it is yet attached to the parent stock. The introduction of other methods has greatly curtailed its use even in nurseries in recent years. Budding and grafting when suitable stocks can be found are preferred to the slowerand more laborious practice of layering. Experience also has shown that ma ny of the subjects formerly believed capable of being increased only by layering may now be propagated by cuttings freely enough for all purposes. These circumstances, combined with a not very well authenticated but commonly entertained opinion that trees and shrubs, especially the former, propagated by layering are shorter-lived than those obtained by any other method, have tended much to lessen the practice. Still there are a good many species and varieties of trees and shrubs that are and must continue to be propagated by layers till our knowledge and possession of suitable stocks to work them upon by either budding or grafting or in-arching is more extended, for they are not amenable to the more easy way of increase by cuttings.

The season for layering is usually regulated in nurseries by convenience, and the most convenient time is either autumn or winter. The *stools*, as they are called, in other words the parent plants, must be cleared of the previous crop of layers, which may be planted out, and for the time be done with before a fresh crop can well be provided for, and this is most conveniently done in autumn or winter. This system answers well even though it is theoretically somewhat opposed to the physiological principles on which success is believed to rest. The theory is, that complete success in layering depends on a check being given to the descending sap at a point on the branch that is brought in contact with the ground. Hence it follows that the check should be administered at a time when the descent of the sap is most abundant, which would probably in most cases be about midsummer. But experience has taught us that this work may be done any time in autumn or winter, the earlier, however, the better, with unvarying success, and that it is never well to leave it over till spring, which is not only the worst time for the work, but is usually overburdened with other operations which can only be well performed at that season. But the chief reason for doing the work in autumn and winter is, as has already been observed, that the previous crop can be cleared away, which is a necessary preliminary to laying down another. This then should be done in autumn as early as it can be done with safety. Evergreens may be dealt with first, because they can be lifted and transplanted as soon as the ultimate or last-formed leaves are full grown and the points of the shoots of the season are tolerably firm. Deciduous subjects, on the other hand, cannot be dealt with till there is a pretty close approach to the end of the autumn, but the fall of the last leaf should not be waited for, the wood must be firm; but it will be an advantage rather than otherwise if there are a fair number of the leaves attached when the layers are transferred to their own bottoms in permanent quarters. The work of layering should then be set about forthwith as if time were precious, which it is assuredly. Now for the mode or modes, for they are several.

But first let it be understood that where there is much call for the practice of layering on the part of a forester, there should be a well-ordered stool ground established, containing well-selected specimens of the various subjects to be operated upon. These should be planted at such distances apart as will ensure ample convenience for necessary work, including barrow-work, and also for the spread of the branches without the risk of their being injured while in growth or disturbed after they are layered. If the requirements are small and there are parent plants of the kinds wanted in the woodlands or grounds, there will be no need for a stool ground of the kind indicated, as the layering may take place where the parent stands, if it is in a practically favourable position for the operation.

The principal consideration in layering any plant is how best to check the descending sap at a point of the layer placed in contact with and covered with soil. Experience has shown that this object is best attained by making an incision on the under-side of

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the branch in an oblique direction upwards 1 in. or more in length, according to the dimensions of the branch, and penetrating to half the thickness of the same. This is the most common method, and when it can be practised is the best. But there are brittle and pithy subjects that will not submit to this treatment; they snap asunder as soon as it is attempted to bring them in contact with the earth, and elevate the point of the shoot as much as is necessary towards the perpendicular. In such cases barking and scarifying the bark hard into the alburnum or young wood; ringing the bark, that is, removing it all round or only on the under-side to the width of ½ in. or ¼ in.; piercing, that is, forcing a small knife or an awl through the branch horizontally, and wiring or twisting a piece of wire round the branch at the point to be layered, and then scarifying the bark on the under-side, may be tried to overcome the difficulty. The point of the branch operated upon must then be brought in contact with the earth, and held there with a peg or pegs according to the strength of the branch, but there should be no risk of its drawing the pegs and setting itself free after it is placed in position. If the check is effected by incision as first described, be careful in pegging the branch down to keep the tongue or heel formed on the under-side from returning to its position and closing with the upper half again, otherwise there may be a failure in the operation. When the pegging is satisfactorily done, the point of the layer may be brought as near perpendicular as possible, and the base covered with 3 ins. or 4 ins. of sharp sandy soil. It is, perhaps, necessary to add that if the natural soil is heavy and wet, it should be rendered light and dry before the operation of layering is attempted, and that the soil in which the layers are placed should also be deeply stirred.—*Forestry.*

SEASONABLE NOTES.

The Flower Garden.

Propagating.—The present is a favourable time for propagating most kinds of Foliage and Flowering Plants in the open ground. Crotons, Panax, Aralias, Ixoras, Hibiscus, Oleanders, Goldfusias, Poinsettias, Eranthemums, Graptophyllums, &c., now root most readily if treated as follows. Select a shady position, make up a bed with good light soil, as large as may be required, and raised from four to six inches above the ground level; draw drills three inches deep, at a distance of four to six inches according to the size of your cuttings, and at the bottom of each drill place a layer of about an inch of fine silver sand, rest the base of the cuttings on the sand and draw the soil firmly round them. Treated in this way there will be very few failures. We do not however recommend out-door propagation to those who possess suitable appliances, such as a small glass house, or frame for this purpose. It is astonishing what a vast amount of work may be done even with a small frame only. We know of an instance in which upwards of three thousand strong healthy cuttings of Foliage and Flowering Plants were struck in one season by an amateur in a frame measuring only 6 ft. by 4 ft., nor is this surprising when we consider that Crotons, Aralias, Panax and many others, root freely in from 10 to 15 days, and some plants, such as Eranthemums, Graptophyllums, Coleus, &c., if kept close, may be potted off on the seventh or eighth day from the time they were put in. Quantity however is not the only point in favour of frame propagation; cuttings when struck in the open air, no matter how carefully treated, invariably lose a certain proportion of their foliage and thereby become unsightly; cuttings struck in a frame being kept at an even temperature, rarely flag, root quickly, and retain all their leaves,—a point of very great importance, for every one knows the difference in the value of plants covered with foliage to their base, and the lanky, leggy specimens so frequently met with.

Increase the stock of Achimines by means of cuttings; Gloxinias by using good and well developed leaves as cuttings; the fine leaved Begonias in the same way as Gloxinias, and also by placing a whole leaf flat on the surface of a pan filled with silver sand, affixing the leaf thereon with pegs, cutting or breaking the ribs at intervals and sprinkling some sand over the surface of the leaf: treated in this way leaves soon form buds at every break. The herbaceous kinds are best increased by means of cuttings.

Caladiums often receive more shade than is really necessary or desirable, as they are never so useful for standing in other positions out of the house in which they have been grown as they are when they get more exposure to the light, plenty of which is necessary to bring out and fully develop the beautiful leaf markings for which they are so highly esteemed.

Aristolochias.—Those who are fond of strange looking flowers, will do well to give the Aristolochias a place: they grow rapidly, and can be had in a blooming state in six months from the time of the cuttings being struck. Their flowers show to advantage trained over a path, in which way they can be grown, or the shoots may be trained round a trellis, taking care to keep the points higher than the other parts; if this be not done they will stop and break out into fresh growth, which generally is not desirable if the plants be not weak and so need strengthening.

Training Plants.—In plant training amateurs will do well to avoid the two extremes of tying their plants too formally, and the opposite of allowing them to hang about in a straggling unsightly state. Every plant, as far as is consistent with the position it occupies, should be trained so as to exhibit as near as possible the form it would assume in a state of nature. No more supports should be used than will keep the plants collectively in shape, as any thing beyond this is objectionable; the sticks in all cases should never be used stronger than is necessary, and ought to be painted a shade of green, the least conspicuous, always tieing the branches as far as possible in such a manner that they will hide the sticks. In the case of the commonest plants, the least susceptible to injury to the roots, the sticks should never be inserted in the soil deeper than necessary to hold them with the branches attached in the position they are placed. With tender-rooted, hard-wooded, subjects it is still more requisite to be careful in this matter. Quantities of trained plants in all stages, from a small stage up to full-grown specimens, are annually killed by numbers of sticks being thrust unnecessarily deep in the soil, the effect of which in mutilating the roots they come in contact with, needs only a slight consideration to fully realize. Care should be always taken not to draw the tying material so tight as not to allow room for the branches thickening, more particularly in the case of such plants as go on from year to year without being headed back.

Moving Shrubs.—We frequently see shrubs, which at first, when small were planted close to give immediate effect with a view to some being thinned out as they got larger, left until they spoil each other. If in the first instance the work was done with judgment, those which were intended to remain permanently will have been put in such a position as will afford them enough room by simply moving the others of less value, which were only put in to fill up for a time; but it frequently happens that this course has not been followed, and that the planting has been done indiscriminately, in which case, when they are grown so as to be too close, a portion has to be taken out, and many required to remain want moving more or less from the position in which they were first planted. Where removal of this kind becomes necessary, it should be carried out before the shrubs have grown into such a crowded state as to injure the whole, as frequently permitted, for independent of the injury inflicted upon all, the longer moving is deferred the worse condition they individually get into for removal. There is no time in the year when shrubs can be more successfully transplanted than from the commencement of July to October, but the earlier it is done after the commencement of the rainy season the better, as the plants have then time to become thoroughly established before the cold weather sets in. Each shrub, as soon as it is taken up, should be immediately replanted, not allowing the roots to have time to dry; in this there must be no delay, indeed, removal is only to be recommended where shrubs can immediately be placed in the new positions assigned to them from one part of the garden to another. Presuming that the surplus plants thus taken up will be again planted where more space can be found for them, ground for them should be prepared beforehand by sufficiently deep digging or trenching so as expedite the work.

Potting Soil of all descriptions is much better kept in the open air than in sheds under cover, where it becomes dry and appears to lose a good deal of the properties essential to the support of vegetable life; but all that is required for use during the

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next three months should at once be got under cover, if possible in an open shed, where it can be spread thinly upon the floor and occasionally turned over, allowing it to remain in a loose open state, so as to expose it as far as possible to the drying influence of the air, which after so much wet is more than usually requisite. Too much cannot be urged as to getting potting soils for even the commonest subjects into a suitable condition as to moisture before being used, for, if plants are put in it when too much moisture is present, it at once assumes the consistency of a hard baked mass in every way unsuitable to free root development, without which no plant can make satisfactory progress. It is well to impress upon beginners, that it is much better to err in having the soil a little too dry than in the opposite of being too wet, as in the former case the only evil that follows is the necessity for applying water at a shorter interval after potting is completed than is advisable,—an operation that should always be deferred as long as possible, except in the case of a comparatively few moisture-loving, vigorous-rooted subjects.

THE VEGETABLE GARDEN.

Garden Peppers.

The Pepper is one of the most valuable of our garden plants. In our experience, it is seldom that we find fifty plants grown from the same sample of seed that are alike in their foliage and fruit. The flowers are very subject to cross-fertilization, and unless the different varieties are carefully separated, the seeds will not reproduce their kind. But all the variations that occur do not appear to be the result of cross-fertilization. For example, certain plants of a variety often bear their fruit upright, while all the others have pendent fruits, the plants showing no other differences.

During the past four years several new names have been added to our list of Peppers, but most of these are new in nothing except their names. I will mention a few of these newer synonyms, and append a brief description of the varieties to which they belong, and of a few other sorts.

Monstrous, or Grossum. This does not appear to be an old variety, at least Mr. Burr, who wrote in 1865, does not mention it; yet if the seeds we have planted have been true to their names, we have grown this Pepper under the following appellations: "Monstrous or Grossum" (Thornburn & Co., 1882), "Spanish Mammoth," and "Moostrous" (Vilmorin, 1884), "Ruby King" (Benson Maule & Co., 1884), "Crimson Queen" (Tillinghast, 1885). The plant of this variety is one and a half to two feet high, leaves very large, the larger ones sometimes four inches long, and more than two inches wide. The borders of the leaves are a little undulate, and the edges are usually curved upward. Their surface is generally somewhat blistered. The stem is usually tinged purple at the nodes. The fruits are pendant, irregularly conical, generally a little curved, terminating in an obtuse point, about five inches long, and two inches in their largest diameter. The color when ripe is brilliant coral red. It is a sweet Pepper, and has very little of the true Pepper taste. In season it is rather late.

Sweet Spanish. This old variety was offered by Mr. Everitt last spring under the name "Red Prince." The plant resembles in general appearance that of the one just described. The fruit is shorter, and very blunt at the apex, where it usually ends with three or four rounded protuberances. Sometimes, however, it ends in a blunt point. It is considerably earlier than the Monstrous or Grossum, and is equal to it in sweetness.

Sweet Golden Dawn. This variety we believe was first offered by Messrs. Thornburn & Co. in 1883, and was last spring sold by Mr. Everitt as "Buttercup." As I find no record in the older books of a yellow Pepper answering to the description of this one, I conclude that it is truly a new variety, and it is perhaps the most valuable new Pepper that has been offered in many years. It has the remarkable quality of being so mild in taste, that it may be eaten like an Apple without the slightest inconvenience. Even the seeds are free from any pungent quality. The plant is 12 to 18 inches high, with foliage resembling that of the varieties named above. The stem is a little angular, of the same color as the foliage. The fruits somewhat resemble in form those of the Sweet Spanish, but they are usually rather more conical and more ribbed.

Large Bell. This Pepper, which is known also as the Bull-Nose, Sweet Mountain and Mammoth, in one of the oldest and best known of the sweet Peppers. It is early and of excellent quality. I do not know that any of the more recently introduced red varieties are much superior to it. In some seasons I have thought that its fruits rotted worse than those of most of the other sweet Peppers, but this may have been accidental. The plant resembles that of the Monstrous or Grossum, while its fruit is very similar to that of the Sweet Golden Dawn, except in its color, which is glossy, coral red.

Chili Pepper This variety is quite distinct from all that I have described above. The plant is low and spreading, the leaves are narrow, smooth and very numerous. The fruits, which on some plants are erect and on others pendant, are conical and but two or two and one-half inches long and about one-half an inch in diameter; it is red in color and extremely pungent in taste.

Cherry Pepper. The foliage of this variety is rather intermediate between that of the Chili Pepper and the sorts described above. The fruit is about the size of the largest Cherries, generally round though sometimes pointed and occasionally oblate. It is red, and very pungent in taste.

Ox Heart: called also "New Ox Heart." This variety resembles the Cherry Pepper in foliage and fruits except that the latter are about twice as large.

Cranberry Pepper. In habit and foliage this variety resembles the Chili Pepper, but is more dwarf. The fruit, which is round and extremely pungent, is scarcely larger than the common Cranberry.

Cayenne Pepper. I am somewhat perplexed in regard to this variety. Both Vilmorin and Burr expressly state that the Cayenne Pepper of commerce is the product of a plant belonging to a distinct species from that of our garden Pepper, and which will not endure our climate. Yet nearly all our catalogues mention this sort, and often the word "true" is appended to the name. I have grown three different Peppers under the name Cayenne, but surely none of these was sufficiently distinct from our other garden Peppers to belong to a different species.

"Elm"—*in "American Garden."*

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ANSWERS TO CORRESPONDENTS

Amateur Gardener.—The Persimmon is the fruit of *Diospyros Virginiana*, also known as the Virginian Date Palm, a native of the United States, where it attains a height of fifty to sixty feet. The fruit is described as being an inch or more in diameter, nearly round, and of a yellowish orange colour, very austere and astringent even when quite ripe, but when softened by the action of frost it becomes eatable. In the Southern States Persimmons are pounded and made into cakes with bran, and by adding yeast and hops to an infusion of the cakes a kind of beer is brewed; or by fermenting and distilling them they yield a spirituous liquor. The bark of the tree is very bitter, and possesses

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febrifugal properties. One species of the genus *Diospyros Kaki* is described by Firminger; several others are also natives of this country, the most valuable of which are *D. Melanoxylon*, *D. Ebenaster* and *D. Ebenum*. From these three the wood known as East Indian Ebony is obtained. The name Diospyros is derived from *dios* divine, and *puros* wheat, literally celestial food, rather a far-fetched name for a genus that contains no edible species of any value.

ENQUIRER.—If you will again refer to the two extracts quoted, you will find that one refers to *plants in pots* only and the other presumably to plants in the ground. We say presumably advisedly, as the writer of the note in question has long since joined the great majority, and is therefore unable to speak for himself, but from our intimate acquaintance with his system of growing Roses, we are convinced that this what was intended. From our own experience, we should say that both plants in pots and in the ground should first have their roots exposed and then pruned, and for this reason: that by exposing the roots we ensure a thorough ripening of the wood, and every gardener knows that this is the *sine qud non* to secure a bountiful crop of flowers, consequently the better ripened the wood is at the time of pruning the more surely shall we attain this end. Plants in pots are of course more manageable in this respect than those in the ground, because they are always come-at-able, and their roots being in a small space are easily reached, and after being opened out, in the event of heavy rains occurring, the pots can be laid on their sides without any fear of injuring the plants. Plants in the ground, on the contrary, are generally so overgrown by the end of the rainy season as scarcely to be come-at able at all, that is, where plants are grown closely in large beds; and there is also another danger, especially where plants have their roots exposed early in the season, and that is that should heavy rains occur afterwards, the plants being top-heavy are frequently blown down and irretrievably injured, unless they had previously been securely staked. These are undoubtedly the reasons that induce many good gardeners to prune first and open the roots afterwards. We however strongly advise that pruning should follow the exposure of the roots and not precede it. We may add one word of caution: do not either expose or prune too early; nothing is gained by so doing. In nine cases out of ten, Roses pruned say November 1st or 15th will bloom earlier and more profusely than those pruned a month previously.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to should be sent in not later than the Friday previous to the day of publication. All communications should be written in one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

JAPANESE FOOD PLANTS.

A list has been published by Herr Mueller-Beeck, Yokohama, where the compiler fills the post of Consular-Assistant of the German Empire. The list goes far to prove the omnivorous character of the Japanese in the matter of food selected from the vegetable kingdom. As with us the Brassicas come in for a large share of attention, and in all cases for the leaves only. The following may be mentioned:—B. climensis, B. orientalis, B. compestris, B. rapa; of the last named both roots and leaves are eaten. Of Raphanus sativus, the Radish, 11 sorts are given, of which the roots are eaten fresh, salted, pickled in Rice spirit, and also decayed. Oranges, Shaddocks and Lemons are found in 6 species.

Peas and Beans are used both for the seeds and pods; but they differ much from our new kinds. Soja hispida (the Soy Bean) is grown in 24 varieties, and are chiefly used for *soy* and misè. The roots of Dolichos hirsutus are employed for the preparation of starch and meal. In the case of D. incurvus, D. umbellatus, D. bicontortus, and D. ensiforme, the seeds and pods are used for the same purposes. The seeds of plants allied to our Scarlet Runner Bean, *viz.* Phaseolus radiatus, P. r. pendulus, P. r. subtrilobatus, and P. vulgaris, are used.

The fruits of Prunus tomentosa are used in the ripe for eating raw and for jam, and in the unripe state in salt and vinegar as pickles. The petals of the flowers of P. Pseudo-cerasus are salted, and likewise used in water as a flavour to drink. The fruits of P. Japonica, and those of P. incisa are eaten. The Pear, the Quince, the Apple, and several other varieties of Pyrus occur, in the list

Under Umbelliferæ are Fæniculum vulgare, Coriandrum sativum, and Daucus carota. Under the name of Shiun-giku the leaves and flowers of Chrysanthemum coronarium are eaten, and the flowers of Pyrethrum chinense are eaten steeped in vinegar. The roots of Tussilago japonica and the leaf-stalks of Petasites japonica are used as spices. Dandelions, Lettuces, and Thistles are used as with us. The leaves of Phytolacca Kæmpferi and 3 other species are used, the first as a vegetable and the others for flavouring. Rumex palmatum and R. acetosella are used in medicine. The fruits of Ficus carica and F. pumila are in use as dessert, and those of Castanea vesca, Juglans regia, J. Sieboldiana, and J. mandshurica.

Amongst Coniferæ the seeds of the Salisburia adiantifolia and Torreya nucifera are eaten. In Cycadaceæ the leaves, pith, and seeds are eaten, sago being manufactured from the pith. The roots of several species of Arums and Alocasias are used as food.

The Liliaceæ furnish the Japan kitchen with many fine bulbs that are cooked for the table, and those chiefly of sorts which find their greatest appreciation as decorative plants in flower beds with us. Apparently all the roots of Japan Lilies are eaten as vegetables, as well as many species of Allium, *viz.* A. Schœnoprasum, A. arenarium, A. senescens, A. odorum, A. cepa A. fistulosum, and A. ascalonicum. Even Ferns do not escape being eaten, as we find that young fronds of Pteris aquilina and Osmunda regalis are made use of for food; and among Lichens Bacomyces digitatus and Usnea florida share the same fate; of fungi Puffballs, Agaricus campestris and one other species of Agaricus, and Tremella auricula are consumed.

Two species of Algæ are in a manner cultivated in Japan; small branches, on which Entermorpha intestinalis and E. complanata attach themselves, are stuck into seawater in September, October, and December, and taken out in November and January, when the sea-weed has grown to a usable size.

The above is merely an extract from an interesting list published by the German Government, which intends further to supply agriculturists, gardeners, and others connected with vegetable cultivation, with seeds of the various plants named in Consul Mueller Beeck's report.

Amongst the varied productions of Japan and China there are doubtless many plants which can be acclimatized in the milder parts of Europe and turned to good account. Our vegetarian enthusiasts should also welcome any addition that would lend piquancy to a fare which, to say the least against it, is uninviting by its sameness.—*Gardeners' Chronicle.*

THE BAMBOO.

The following extract is taken from the "Guide to the Economic and Commercial Court" of the Colonial and Indian Exhibition, compiled by Dr. George. Watt:—

The Bamboo Trophy.—This structure is intended to exhibit the bamboos of India and to show the multifarious uses to which they are put. The idea of such a trophy was first suggested by Mr. Ribbentrop, Inspector-General of Forests, and through the active co-operation of the Forest officers, it has been found possible to bring together one of the most perfect collections of the bamboos ever exhibited. Mr. F. B. Manson designed and constructed the trophy, and took the greatest pains to see that the names of the various bamboos used were carefully preserved, so that the merits of the species might be compared side by side. The trophy consists of an arch over the central transverse path leading from the Art-ware Courts. It is formed of a platform 12 by 10 feet in size, supported on four columns and raised 12 feet above the floor. This platform is reached on the East and the West sides by flights of steps. The steps are covered with pieces of split bamboo arranged in geometrical patterns; the floor of the platform is similarly ornamented. There are forty steps, 20 on each staircase, the designs being all different. Ten species of bamboo have been used in this ornamental work, 4 steps to each species. Two species only have been used in the decoration of the platform. The railing is made of *Bam-*

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busa Brandisii, and some 30 species of bamboo in all are used in constructing the trophy, an index set of which is exhibited on the adjacent walls of the Court. A number of very interesting objects made of bamboo have been hung all over the trophy, but these might be multiplied indefinitely and volumes written on the uses of the various species of bamboo. They are cut up and split into bands in the manufacture of mats of every degree of fineness. Thin strips tied with string are made into excellent *tatties* or door mats. Hollow bamboos when beaten and then split open into flat pieces are used for the seats of chairs, tops of tables, and of beds. The greater number of the people in Eastern India and in the Malay Peninsula live entirely in houses constructed of bamboo. Models of such houses are exhibited in the Ethnology Sub-Courts. Bamboo bridges supported on a multitude of bamboo uprights are frequent all over India. The large hollow species are well suited for aqueducts, water pails, pots, cups, and other vessels. A single joint of a green bamboo is frequently used as a cooking-pot. Spoons, knives, and other domestic utensils are made of bamboo, and a joint of a small bamboo makes a useful tobacco pipe. All the sorts of agricultural implements and the appliances for spinning cotton and wool, as also for reeling silk, are often constructed of the same material. Poles for carrying loads are universally made of bamboo.

The fisherman makes his oars, masts, fishing appliances, baskets and fish traps, and even his hooks, of bamboo. Excellent fishing rods made of the solid bamboo are in universal use all over India. Bamboo rafts are not uncommon, being chiefly used by fishermen. Bamboo is extensively used for making spear shafts, bows and arrows, crude scabbards and handles for swords, knives, and axes. The Nagas of Manipur defend the approaches to their villages by burying sharp-pointed knives of bamboos (*pangis*) among the leaves and soft soil.

All sorts of curious musical instruments are made of bamboo, from the fife to the crude violin with two or three strings, which are also of bamboo. The Nagas make a sort of Jew's harp from the bamboo, and in the Malay Peninsula Æolian harps are made of the village bamboo clumps. A selection of the better stems of the clump is made, and these are perforated in a peculiar manner so as to keep up whistling in all tones at once as the wind blows through the culms. Soft and liquid notes like that of the flute are produced, but with the undulations of the atmosphere these swell into the deep and full tones of the organ.

THE NATURE AND FUNCTIONS OF MANURE,

its value, and the various modes of its application, have been standing themes of disputation among horticulturists ever since the history of gardening has been recorded. All who have read with any degree of attention the various theories which have from time to time been published, must have been struck, and also considerably puzzled, by the great difference of opinion amongst those who profess to know something about the subject. A. thinks there is nothing like ashes or lime; B. pins his faith on bone-dust and superphosphate; C. has no doubt that there is nothing like muck—stable manure being worth all the newfangled fertilisers that foolish experimentalists have invented. His father and his great-grandfather, and all his ancestors, were of the same opinion, and therefore he must be right. D., fortified by long experience, in which all his neighbours have participated, holds manfully to the practice that liquid manure is the one thing needful to successful gardening. E. tells us that he made no money until he used guano, which has converted his barren soil into miracles of fertility, and he therefore looks with pity on all those who do not follow in his footsteps, and as old fogies, who are toiling on in the dark, ignorant of the true remedy for the infertility of their gardens. And thus these controversies have gone on from year to year—no one convinced by the arguments or the experience of others, but each adhering to his own theory and his own practice more strongly than ever.

Now, with the increased knowledge of the nineteenth century, it seems to us that all these various opinions and practices are equally right under certain circumstances, and wrong under other circumstances. No hard-and-fast rule can be laid down for the horticulturist any more than it can for the farmer; each case must be considered on its own merit, according to inherent soil-fertility, locality, and the climatal condition with which the gardener has to deal.

Since, then, every manure has its use and its value under given conditions, the great aim of the practical and thoughtful gardener should be to ascertain exactly what those conditions are, and the special circumstance under which their application can be made profitable.

Science has demonstrated very conclusively that every species of plant, whether growing wild or cultivated by the gardener, has its own peculiar chemical composition, consisting of a greater or lesser number of elementary substances united in well ascertained and definite proportions. It is also well understood by the horticultural chemist that plants have no power inherent in them of creating matter, but that their vitality only enables them to select and combine such materials as are presented to their feeding organs from without. The only sources of supply are the substances within reach of their absorbing or feeding organs, and these substances must therefore be contained in the soil or the atmosphere immediately contiguous to them.

The essential elements that are supplied by the atmosphere are carbon, which plants take from the carbonic acid of the air; oxygen and hydrogen, which come from the air to the soil and are absorbed by the roots of the plant, and a part of the nitrogen.

The essential ingredients that must come from the soil are potash, lime, magnesia, iron, phosphoric acid, sulphuric acid, a small amount of chlorine, perhaps a minute quantity of silica, and, finally, considerable nitrogen.

Consequently, in order that our plants may grow and thrive, they must have at the disposal of their roots in the soil a sufficient quantity of each of these ingredients of their food. If any one of the more important constituents—potash, lime, phosphoric acid, or nitrogen—be deficient, the whole plant suffers.

If we have a gardener especially eloquent on the virtues of any particular manure, to the exclusion of all others, we may be sure that he is the cultivator of soil rich in most of the elements of plants, but deficient in one or two of them; the addition of these missing substances will then produce truly astonishing results, and those who witness them can hardly be persuaded that what has proved so useful to themselves can be useful in the hands of others.

Every cultivable soil, however exhausted it may be, is capable of supplying more or less of these essential elements of plant-food, which it derives from the *débris* of pre-existing vegetation. This is called its inherent fertility, or natural strength. To this important point it is our intention to return shortly, putting before our readers the best ascertained means by which the fertility of our gardens and fields may be maintained.—*Gardeners' Chronicle.*

IMPROVED DANDELIONS.

The leaves of the Dandelion, from the remotest time, have been used as spring salad; but, being so plentiful in Corn fields, meadows, and on roadsides, the plant itself is seldom cultivated. Immense quantities of it are brought daily by rail to the Paris markets, coming occasionally from districts as far off as 300 or 400 miles. It is used in a green and also in a blanched state, the former from meadows, the latter the produce of roots buried in autumn by the plough. Occasionally, when rivers overflow, they leave a thick layer of rough mud, straw, weeds, &c., on the surrounding meadows, and when this deposit is raked off, Dandelions, beautifully white, are found under it. Lately, however, their cultivation has greatly increased, even in gardens, where they are grown as an ordinary vegetable. Three varieties are now cultivated. 1. The common Dandelion, the leaves of which are all radical and lie nearly flat on the ground, from 2 in. to 8 in. long, deeply serrated, light green, dark green or brownish, according to locality and soil. Some botanists have supposed that there are several species of the wild Dandelion, but that is not the case. 2. Large-leaved Dandelion, the leaves of which are numerous and larger and more substantial than those of the common kind. The plants are also better furnished with foliage and produce a better crop. It is, in fact, an improvement on the common kind; but, nevertheless, it is seldom met with. 3. Cabbaging Dandelion, in which the centre or heart is entirely filled up with small leaves, which, as

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they increase in growth, show a tendency to turn inwards, like an Endive. By means of careful selection, this kind might easily be greatly improved.

Dandelions, we know, are not difficult to grow. They should be sown in April or May in a well-prepared bed in rows 4 in. apart. The young plants, if too thick, should be thinned out, and they should be kept clean by means of frequent hoeing. In October clean the bed and remove the greater part of the leaves, and spread over the whole from 3 in. to 4 in. of light soil, sand, or leaf-mould. As soon as the young leaves show themselves above the top-dressing, the crop is ready for use. The soil should then be removed, when the leaves will be found to be beautifully blanched. They should be taken up with the top of the root attached to them. The improved sorts should have a little more room than the common kind. Another and perhaps a better way is to sow in April or May, and to transplant into another bed the best of the seedlings, subsequent cultivation being the same as that described above. Sometimes the full-grown roots are taken up in October and transplanted close together in another place, an operation which does not disturb their growth, and the produce is the same during winter. Roots tied into bundles in October may be forced in a cellar, like the Barbe de Capucin, to the produce of which Dandelion has a great similarity. In America, where much attention is paid to the culture of Dandelions, after the plants have become fully grown in the autumn, a frame is put over them, and some are even forced, in order to obtain an earlier crop. In the open ground it takes about a month to blanch the plants, much depending of course on the character of the soil and the weather.

Growers who care only for the roots sow in October in drills 1 ft. asunder, thinning the young plants to 3 in. apart. The following autumn the roots are taken up, cleaned, sliced, dried, and sent to market. The roots are ground and used as a substitute for or mixed with Coffee, like Chicory.

When Dandelion is used for salad it is dressed with salt, pepper, oil, and vinegar, or boiled and eaten with meat. The leaves must be washed and well dried before being used; this is very important if good quality is looked for. If got from a meadow, select, if possible, plants with short, deeply serrated, brown leaves, which are far superior to those having long, pale green foliage, grown under hedges or in the shade. Dandelions, I am glad to say, may now be seen daily in Covent Garden Market. Should the plants bought be faded, dip them in water, and in a few hours they will revive. D. Guiheneuf, in "*The Garden.*"

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Editorial Article.

PARING AND BURNING LAND.

THIS method of clearing land is of very ancient date, and is more generally resorted to by the agriculturist than the gardener, probably for this reason—that in a well-kept garden the soil is kept at such a high state of efficiency by continuous manuring and constant cleaning as rarely to require any such radical treatment, for one of the principal advantages of paring and burning is, that in one operation it not only cleans the land but also manures it. In the formation of new gardens, however, and especially where the ground is overrun with noxious weeds and the coarser kinds of grasses, such as *Ooloo* (Imperata cylindrica) and *Mootho* (Cyperus hexastachyus), this is frequently not only the most effectual but also the cheapest and most expeditious means of clearing the ground.

In carrying out the system of paring and burning, we must first consider what soils are suitable for the work, and our experience teaches us that light, sandy soils are not adapted for it, nor is it so much required for cleaning this kind of land, because these soils work freely, and therefore the grass and weeds are easily separated from the earth, and besides soils of this description rarely become so foul as those of a more tenacious nature. It is also difficult in practice to burn these soils, because when turves or bunches of grass grown upon these soils are cast on the fires they settle down so closely that the air is impeded in its circulation through the heap, consequently the fire burns slowly or goes out entirely. The soils best adapted for paring and burning, in order to obtain the full advantage of the process, are those of a strong calcareous nature, and most other clays, the object being to obtain manure as well as the destruction of weeds. We obtain important results by the residue or ashes of the stronger soils of any description, and especially those yielding a large amount of potash and carbonate of lime, each in varying proportions according to the composition of the soil before burning. In the process of burning, valuable ashes are obtained from the coarse grasses and other weeds the soil may contain. These weeds and grass when left in undisturbed possession of the soil, are the resort of various sorts of insects inimical to almost every kind of produce, and although these insects may be greatly disturbed by the ordinary process of culture, yet their entire destruction is only obtained by the action of smoke and fire in the case of paring and burning. The enemies to crops are really so numerous that it would be simply impossible to enumerate them all, but the chief of them consist of wire-worms, grubs, slugs and snails ; all these will be destroyed entirely by paring and burning the land, especially if it is done by turfing and burning with as little disturbance as possible to the turves after being cut. We strongly advise the plan of

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paring as compared with cultivating before burning-which is sometimes adopted, because the latter plan during tillage would so disturb the insects in their haunts and holes that many would escape and again hide themselves in the loose earth before the clods could be placed on the fires, but it is otherwise when the surface is cut over by paring say to a depth of four to six inches, because in that case they would be but little disturbed in their hiding places before the turves where placed on the fires. This is one of the strongest reasons why the old style of paring and burning is still most advisable. We must now refer to the record of experimental investigations made on the subject by Dr. Voelcker, one of our greatest authorities upon many points and practices in agriculture and scientific farming. He says :—"I am prepared to adduce reasons founded upon analytical evidence and well-established agricultural experience, in support of my conviction, that paring and burning on some kinds of soils is not only a profitable operation, but that it is under certain circumstances by far the most rational plan of cultivation which can be adopted in our present state of knowledge for raising upon some kinds of land the largest amount of produce with the least expenditure of money. In connection with the policy of paring and burning we must expect to meet objections, and to encounter some opposition from both practical men and theorists also, the former through want of experience, and the latter through misapprehension of the teachings of science. Various classes of objectors have arisen from time to time. There have been three principal ones which we shall refer to separately. The first objectors condemn the practice because they say it destroys the organic or vegetable matters in the soil, and that it causes a waste of a most important class of fertilising constituents. In reply we do not deny that vegetable matters are soil constituents under all circumstances, and prove more or less valuable as fertilisers; in fact well cultivated and productive soils invariably contain much organic matter, which circumstance has led many to suppose that the productiveness of the soil depended upon their relative proportions found therein. Not many years past it was customary for agricultural writers to estimate the relative state of fertility of different soils by determining the amount of humus or decomposed vegetable matters in each. This it must be understood is clearly contrary to reason and well ascertained facts, for there are soils which, like peaty lands, contain a large percentage of vegetable matter and yet are comparatively sterile. On the other hand there are very many fertile clay soils which contain hardly any humus and yet are highly productive, and which for this reason may with much advantage be subjected to the process of burning. The last objection we have to notice is on the ground of expense, and maintaining that it is more profitable to lay out money in the purchase of Guano, Superphosphates or other artificial manures than to spend it in paring and burning. In reply we may observe that the opinions of practical men on this subject furnish most reliable evidence that paring and burning, as practised by the best farmers in England, proves conclusively that it has been found to be the most economical means of culture for many descriptions of crops."

We quote from Dr. Voelcker's essay on the subject, who observes: that "Numerous personal enquiries lead me to confirm the opinion expressed by Mr. Caird, who says that the best farmers burn the most, and he rests his opinion on the testimony of several practical men. Amongst other things he mentions a field that had been broken up from its natural state just fifty years ago; it was then pared and burned and so started for the first crop of turnips, which supported the other crops of the course. The same process has since been seven times repeated; no manure of any kind had ever been applied, and yet the crops in each succeeding rotation had shown no signs of decreasing. The soil which lies on the limestone foundation is very thin, but not more so than when first broken up." We have quoted this because it is so much in accordance with our own practice in paring and burning, for, after spreading the ashes resulting from burning, we have never had occasion to apply manure of any kind for a number of years when the soil burned has been of a strong loam or clay nature. In again quoting Dr. Voelcker in respect of the mode of burning, he says: "A certain degree of heat is necessary to induce a proper chemical action; but, as demonstrated by my former experiments, an excessive heat should be carefully avoided, inasmuch as it has the effect of rendering burnt clay again less soluble. It is no doubt for this reason that practical men recommend stifle burning, for this prevents the heat of the heaps of burning soil becoming too intense, consequently stifle-burnt clay is always very porous, crumbles readily to powder, and is more easily soluble than clay burnt at a higher temperature."

In accounting for the advantages of paring and burning, the changes in the organic matters of the soil must not be overlooked. Soils which are regularly pared and burned often contain much vegetable and organic matter, and afford therein fuel for burning a considerable quantity of the soil itself. It must be understood that the destruction by fire of the organic remains in heavy soils, far from doing any harm, is the most available and economical way of preventing their undue accumulation. The fire, we would observe, also destroys insects, their eggs and larvæ, as well as the seeds of weeds, bits of underground stems which, like those of many species of Grasses, are apt to grow again, and which therefore cannot be disposed of so effectually as by burning; in short, nothing cleans land so cheaply and effectually as paring and burning. We must now observe that the excess of undecomposed vegetable matters are found to be injurious to vegetation. Peaty soils furnish familiar examples of this. In conclusion it must be understood that the destruction of vegetable matter in soils adapted for paring and burning is not attended with any evil consequences. Inert vegetable matter is changed by burning into highly effective mineral food for crops. Burning improves materially the mechanical condition of the strong soils by rendering them more porous and more easily cultivated. The ashes produced by paring and burning are especially useful to green crops, because they contain a large portion of phosphates and also potash, constituents which are known to promote in a high degree luxuriant growth.

Editorial Notes.

A GARDENING contemporary states that the cultivation of the Dahlia is incompatible with the success of the bee-keeper.

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SOUND ripe bananas or plantains contain about 22 per cent. of sugar when stripped of their rind. It has been suggested that a good spirit might be obtained by fermenting them.

SOME experiments by M. Barthélémy prove that there is always an insensible exhalation over the whole surface of the leaf by dialysis; secondly, that the stomata (or mouths) of the leaf, under the influence of heat, suddenly allow outbursts of vapour; and, thirdly, that accidental exudation takes place when the equilibrium of absorption at the roots is disturbed.

IT is difficult, says a Belgian journal, to distinguish between iron and steel tools. They have the same polish and workmanship; use will commonly alone show the difference. To make the distinction quickly, place the tool upon a stone, and drop upon it some dilute nitric acid, (four parts of water to one of acid). If the tool remains clean, it is of iron; if of steel, it will show a black spot where touched by the acid. These spots can be easily rubbed off

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THE Cucumber is known to have been cultivated for more than three thousand years. In ancient Egypt it was extensively grown, and is so at the present day. The precise date when the plant was first cultivated in England is not recorded. With the melon, it was commonly cultivated in the reign of Edward III.; but, in consequence of the wars of the Roses, the cultivation of it was neglected and at last entirely lost. The plant was introduced again at the later part of the reign of Henry VIII.

EUCALYPTUS.—At the Linnean Society on November 5, there was shown for the Baron von Mueller a characteristic collection of skeleton leaves of species of Eucalyptus prepared by Mrs. Lewellin, of Melbourne. These confirm Baron von Mueller's observations as to definite layers and the relation of these to the skeletonising process. The leaves in decaying produce no bad odour. Mueller's observations do not support Mr. Riviere's statement that the bamboo is as good as Eucalypts to subdue malaria; the former dry up, but do not exhale the volatile oil, as do the latter, and the Eucalypts, moreover, absorb moisture as quckly as Willows, Poplars, and Bamboos.—*Gardeners' Chronicle.*

TOBACCO IN GERMANY.—Tobacco smoking is said to have been introduced into Germany by troops sent from England to assist the King of Bohemia, during the Thirty Years' War, about 1620. The first pipes used were the long clay pipes in one piece, still common in Holland and in the roadside inns of England; but, in 1689, an Austrian medical man invented what is now generally known as the German pipe, consisting of a mouthpiece, stem and bowl. Other materials than clay then came to be employed, especially wood, which afforded facilities for carving; and this was supplemented, about a hundred years ago, by meerschaum, then first brought to Vienna by Turkish merchants.

PROFITS OF ORANGE GROWING.—At Philadelphia, in Fulton Market, and at various places in Central New York, the common sweet Oranges of Florida have been sold at 4s. per dozen, when Oranges from the West Indies and from the Mediterranean were selling at 1s. per dozen. I have no hesitation in placing the present annual average income derived from easily accessible groves in full bearing at £200 per acre. I know instances in which this rate has been greatly exceeded. It is advisable, however, for the producer not to expect a nett income of more than £100 per acre—100 trees to the acre, 500 Oranges to the tree, and 4s. per 100 for the Oranges above the cost of production. —*P.P. Bishop.*

HUMUS.—Humus is vegetable matter in a condition of partial and arrested decomposition; perhaps we might better say organic matter, either vegetable or animal, and yet agriculturally speaking, all humus comes from vegetable growths. It is found nearly pure in some forms of peat, and it is a component of all fertile soils. A large part of the manure added, rapidly forms humus in the soil. The roots and all other parts of plants, when buried, rapidly take that form when they blend with the soil. The use of concentrated fertilizers, ordinarily renders it necessary for the farmer to take some means, like the plowing in of green crops, to keep up the supply of the vegetable matter, or humus, in the soil, otherwise it will rapidly deteriorate.

NO NEED TO FEAR COMPETITION.—The American farmer never need fear the competition of his foreign brethren. He is his own landlord, his own manager, his own tenant, and his own workman to as large an extent as is practicable. Moreover, he is educated and intelligent, and therefore apt to learn and improve, and is industrious. No other farmer in the world enjoys all these advantages, and as every one of these helps to make him successful in his task, he can never suffer from the competition of those who have rents to pay to landlords, or who hire managers, and go themselves soft-handed, or who have to depend wholly upon hired labor, or who are, on the other hand, plunged in the deepest poverty and the densest ignorance.—*American Agriculturist.*

TIMBER.—Timber changes but little in the process of seasoning in the direction of its length, but it shrinks considerably in the direction of its thickness. Much economy may be practised, and great waste prevented, by builders having sheds of sufficient extent; the ventilation should be whole, and without partial draught, which might affect the ends or any portion of the drying wood more than another; and, as timber rots so much more rapidly by the ends than by the sides, the roof should hang well over to protect them. The advantages of shedding wood are very evident, for, left exposed at one time to the scorching heat of a noonday sun, at another to the effect of drenching rains, and in the winter split, shaken, and riven by the freezing of the water which has insinuated itself into the pores, it has been found by those who deal largely with it, that it needs but short work to destroy it.

THE FORMATION OF COAL.—Mr. E. A. Wunsch, in his annual address to the Geological Society of Glasgow, referring to the evidence shewing the immense time required to produce a seam of coal, drew attention strongly to the conditions which he had examined in the Isle of Arran. There he "found numerous cylinders of trees completely flattened of course, lying across each other at various angles, with their bark, compressed into less thickness than common pasteboard, and the carbonaceous matters reduced to graphite, so that from 3 in. to 4 in. in thichness of this impure coal contained probably twenty generations of trees overlying each other. Now if we allow thirty years only for the life of each tree, we have 600 years for the formation of 4 in. of impure coal, or 1800 years for the formation of 1 ft. of coal."

THE PRODUCTION OF HEAT IN FLOWERS has often been observed and measured, and the general chemical explanation given of the phenomenon is no doubt true in the main. It depends upon oxidation or the union of oxygen gas with the tissues of plants or their contents, and to the "combustion" or destruction that goes on in consequence, accompanied by the emission of carbonic acid gas. In an earlier stage of the plant's life the process is just the reverse. The leaves and green portions of the plant when exposed to sunlight give out oxygen gas; the process is one of deoxidation, and with it occurs a process of evaporation of moist vapour from the surface; both cooling processes; so that while on the one hand during the flowering period and during the ripening of fruits and the germination of seed we may expect the temperature of the plant to rise: on the other, all the time assimilation of carbon is going on in its tissues still green and exposed to light the temperature may be expected to be no higher than that of the surrounding air.—*Gardeners' Chronicle.*

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DR. TALMAGE ON THE CHRYSANTHEMUM.—In a recent sermon, Dr. Talmage, of Brooklyn, U. S. A., said :—"The Chrysanthemum has taken us this week by storm of bright colours. Horticultural Hall, New York, has been all ablaze with this foreign flower. Even people who long ago decided that the Chinese must go, have generously decided that this Chinese plant may take possession of our gardens and hot-houses. Thousands of citizens have paid this week for the privilege of looking upon these constellations of floral beauty. To walk among them has seemed like crossing a corner of heaven. We applaud this floral exhibition as indicative of elevated taste. He who in the Book of Books compares himself to the Rose of Sharon and the Lily of the Valley, no doubt approves of this decoration of our city. There is a possibility that the Rose, which has heretofore been considered the Queen of Flowers, may be outvoted by the one thousand varieties of this Mongolian importation. Long live the Chrysanthemum!" —*Gardening World.*

A NEW VEGETABLE PEST IN AUSTRALIA.—The *Colonies and India* states that farmers have cause for grumbling in Australia as well as in England. In England the main causes are successive wet seasons, and the fact that other countries can place their produce on the English market at a lower figure than the English producer can accept and yet have a profit. In Australia farmers complain that droughts are too common, and the means of conveyance are not sufficient to take their produce to market. In addition to these drawbacks they are plagued with locusts, marsupials, and rabbits, and with Bathurst Burr, Thistle, Prickly Pear, and Sweet Brier. To this list the Lantana appears likely to have to be added. The Lantana is a shrub resembling a gigantic Raspberry bush, bearing seeds which are much relished by birds, which scatter them far and wide, and already the neighbourhood of Sydney possesses a considerable growth of the unwelcome stranger. It appears to have been imported from France as a garden flower, and, if it could be confined to the garden, it would be an ornament instead of a nuisance. But in New Caledonia it has already covered valleys and mountain slopes with a luxuriant growth of almost impenetrable scrub, rendering a large extent of country utterly valueless until it has been rooted up and burnt. So many runs have been seriously prejudiced in value by neglect in coping with Burr and Thistle, and latterly with Prickly Pear, that it is to be hoped that this new vegetable pest will not be allowed to make headway.

WHY SEEDS FAIL.—When purchased seeds fail, the seedsman is blamed. If seeds do not produce a crop true to kind, the fault is probably that of the seedsman, or rather of the seed grower; but when seeds fail outright, the fault is generally that of the one who sows them. Entire failure with seeds is usually due to one of two causes: Too deep covering, and to improper covering. When the seedling plants appear above the surface of the soil, the growth made in doing this is entirely from the contents of the seed. The stem of the minute embryo, the rudimentary plant, elongates, a portion pushes downwards into the soil, and another pushes upwards towards the surface of the soil. The material for this growth was provided beforehand in the seed itself, either in the seed leaves of the embryo, as in the cucumber, or outside of the embryo plant, as in the beet. This growth takes place before the plant has formed any roots by which it can take up nutriment from the soil. It is evident, if the seed be so far below the surface that the material provided for the growth of the young plant is exhausted, before that reaches the surface, it must die. Hence, covering too deep is a frequent source of failure. If the seeds are but slightly covered with very loose soil, the embryo plant, after it starts, is in contact with the air, which fills the spaces between the particles of the soil and soon dries and dies. This common cause of failure may be avoided, by compacting the soil, bringing its particles in close contact with the seed, and protecting the tiny plants from contact with the drying air. Hence, compacting the soil by the use of a roller, by patting the surface with the back of a spade or by the old method, rough, but effective, of "treading in the seed," by passing over the rows with the feet, either of these, which produces the same result, will ensure success with seeds which otherwise would fail. These are most important points, to be heeded at sowing time.—*American Agriculturist.*

Original Articles.

BULB GARDENING IN INDIA.

LILIUMS OR LILIES—(*continued from page* 247)

The following descriptive list of the numerous varieties of this beautiful family is taken from that admirable work "Bulbs and Bulb Culture." The kinds best adapted for cultivation in the plains are marked thus* ; all the varieties may be grown in the hills at an elevation of 4000 to 8000 ft.

"Liliums are scaly bulbs, varying in size and colour, and are found in the temperate zones of the Old and New Worlds. They flower from the early Spring until late in Autumn, the flowers being mostly white, yellow and red. The Lilies have no calyx, properly so called, being naked at the base. The corolla or perianth is six-petalled, funnel or bell shaped, divided into equal segments, smooth, and marked with a flat prominence on the expanded flowers ; stamens six in number, filaments of equal length to, or even shorter than the perianth ; anthers oblong, incumbent, attached on the inside by the middle of the back ; germ or ovary cylindrical, six-furrowed ; style cylindric as long as the corolla ; stigma, thickish, rounded, three-lobed ; capsule, six-furrowed, and angled with a three corner hollow, with three-valved cells ; seeds numerous, margined, covered with a brown covering or skin; leaves numerous, either scattered or in whorls, generally long, narrow, pointed and smooth.

Mr. Baker has classified the lilies in accordance mainly with the shape of the perianth or flower, and also the character and disposition of the leaves, on a similar principle as the size of the corona or crown of Narcissus is made the basis of classification.

The following are the sub-genera of lilies as arranged by this distinguished botanist :—

Sub-genus I. *Cardiocrinum:* Perianth funnel-shaped, with oblanceolate segments, falcate only at the apex. Leaves, stalked, heart-shaped ovate. Examples : *L. giganteum* and *L. cordifolium.*

Sub-genus II. *Eulirion* : Perianth funnel-shaped, with oblanceolate segments, falcate only at the apex; leaves linear or lanceolate, sessile or nearly so. Tube scarcely widened from the base to the middle. Examples : *L. Phillipense, L Wallichianum, L. longiflorum, L. Neilgherrense.* Tube gradually narrowing from the base to the neck ; leaves scattered. Examples : *L. Japonicum, L Krameri, L. Nepalense, L. candidium, L. belladona.*

Leaves in whorls. Examples : *L. Washingtonianum.*

Sub-genus III. *Archælirion* : Perianth open, funnel-shaped, with deeply spreading segments, which are broadest below the middle ; stamens diverging from the curved style. Leaves sessile. Examples : *L. tigrinum, L. oxypetalum.*

Leaves shortly stalked. Examples : *L. speciosum, L. auratum.*

Sub-genus IV. *Isolirion*: Perianth erect, with segments which are falcate in the expanded flower, but not revolute ; stamens diverging on all sides from the straight style. Leaves in whorls. Examples : *L. Philadelphicum, L. medioloides.*

Leaves scattered, style longer than the ovary. Examples : *L. bulbiferum, L. croceum, L. davuricum, L. Catesbi.*

Sub-genus V. *Martagon* : Perianth cernuous, with the segments very revolute ; stamens diverging on all sides from the straight style. Leaves in whorls. Examples : American species—Bulbs annual bearing rhizomes : *L. Canadensis L. pardalmum, L. superbum, L. Roezeli, L. Columbianum, L. umbellatum.* Old World species : *L. Martagon, L. anemaceum, L. Hansonii.*

Leaves scattered, lanceolate, many nerved, perianth falcate above the middle. Example : L. monadelphum. Perianth revolute to below the middle, *L. polyphyllum, L. ponticum,* L. carniolicum. Leaves narrowly linear, with one or few nerves ; segments of the perianth six to twelve lines broad in the middle. Examples : *L. tes-*

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taceum, *L. Leichtlini*, *L. pseudo-tigrinum*. Segments of the perianth three to six lines broad in the middle: *L. pomponium*, *L Chalcedonicum*, *L. callosum*, *L. tenuiflora*. Another sub-genus has since been added, *Notholirion*, in which to place doubtful or uncertain species. At present it has only been furnished with the intermediate plants between a Lilium and a Fritillaria: *L. Thompsonianum* and *L. roseum*.

Sub-genus I.—Cardiocrinum Group.

Lilium giganteum and *cordifolium*.—For all practicable purposes these two are the same, though one is a native of India and the other Japan, and certain botanical differences have been noticed that have induced botanists to designate them distinct species. This is the noblest and most stately of all lilies. Its mode of growth is likewise different from others. It has a great number of large leaves near the ground, and some also on the stems, something like, though more blunt and much thicker than those of *Eucharis Amazonica*. The bulbs are large, and the stalks rise to a height of five to ten feet, very stout and strong at the base and tapering towards the extremity, more like the stem of a flowering aloe in miniature than an ordinary Lily. The flowers are very large and numerous, from 5 in. to 6 in. round the neck, arranged in racemes 15 to 24 inches long, and from six to twelve flowers in a raceme, the colour being white, tinged with green on the outside and stained with purple on the throat. This is at once the most majestic and striking of all known Lilies when in flower, and is so strikingly different in form, and general habit from all others, as to have been excluded from the family by some botanists. Its very distinctness, however, claims for it a place in every garden.

Lilies with erect Bell-shaped Flowers.

Isolirion Group.

L. bulbiferum.—This is perhaps one of the most generally grown and best known of all Lilies. It is a very strong growing, crimson and orange spotted Lily, found in most old-fashioned gardens, and possessed in an extraordinary degree of the power of holding its own against all comers, and even enlarging itself indefinitely by forming bulblets in the axils of the leaves, and at times all up the stems, and forming whole families of the same around the base of the stem. It is therefore peculiarly well adapted for establishing and extending itself in difficult or unfavourable positions. It is probable that there are upwards of a dozen varieties of this fine old Lily in cultivation. The leaves are numerous and narrow, the flowers vary from six to eighteen, and are arranged on a sort of raceme or head.

L. croceum, as the name implies, has generally more orange in the flower than *L. bulbiferum*, which is crimson and orange spotted, *croceum* being light orange spotted black. It seldom or never forms bulblets in the axils of the leaves. There are also, however, several sub-varieties of *L. croceum*, as *præcox*, an early flowering sort; *Sulgidum*, a fiery red variety, with black spots; *sibiricum*, dwarf yellow, and *tenuifolium*, a somewhat graceful yellow variety with dark spots. This is however rather delicate.

**L. davuricum* is less robust than *bulbiferum*, the stem has little or no down on it, a general characteristic of the species. Neither are the flowers quite so numerous, seldom exceeding six or eight on a stem. This variety is not very common in gardens. It is a noble orange-red Lily with yellow centre.

**L. umbellatum*, of which there are several varieties, is classed by some as a sub-variety of *bulbiferum* or *davuricum*. Most of the forms of *umbellatum* are stronger and more robust than *davuricum*, and are noble rich Lilies, growing from 1½ft. to 3ft. in height.

**L. umbellatum erectum* is an extremely robust carmine, scarlet and yellow variety, particularly showy and handsome.

**L. umbellatum, immaculatum*, deep orange, shaded red, not spotted.

**L. umbellatum, incomparibile*, deep crimson and orange; one of the finest of this showy section.

**L. umbellatum sanguineum*, very deep coloured, striking and distinct.

**L. umbellatum punctatum*, richly spotted; fine robust growing variety.

**L. Thunbergianum* is a native of Japan, and as yet rather uncommon, though first introduced nearly thirty years ago. It may be roughly described as the Japanese type of the European *bulbiferum*. It is a noble Lily, softer in colour and larger in size, the expanded flower being quite five inches across. The colours range from soft apricot to the richest crimson shades, and altogether the *Lilium Thunbergianum* and its numerous varieties are amongst the finest of all for open air culture. It has no bulblets in the axils of the leaves, and unless in the case of L. maculatum and Wilsonii, few of the sub-varieties of this sub-species of *bulbiferum* are much spotted.

The following are amongst the finest and most accessible varieties of *Lilium Thunbergianum*:—

**L. T. atronsanguinea grandiflora*, rich crimson bicolor, orange red, striped with orange.

**L. T. fulgens*, rich crimson.

**L. T. Wilsoni* (*pardinum*) richly spotted and maculated, almost like a Tiger-Lily, probably a hybrid between *L. bulbiferum* and *L. tigrinum*.

**L. T. citrinum* (Prince of Wales) is golden yellow, black dots, rich and striking.

**L. T. flore pleno* (*staminosum*) is a double variety of a deep red colour, thickly covered with black spots.

**L. T. mutaceum aureum* (*nigro maculatum*) is one of the most dwarf—from 6 to 9 inches high—and beautiful of Lilies, of a rich soft apricot colour, spotted black.

**L. T. Armeniacum* (*venustum*) is a beautiful salmon yellow coloured Lily free from spots, a colour and style rare among lilies.

**L. T. Van Houttii* is a charming new variety with broad petals of a bright crimson, and orange shade, and very large spots.

Lilium Catesbæi is one of the smallest and most beautiful Lilies, introduced in 1806. It seldom grows to more than 1 ft. or 1½ ft. high. A higher stature is often quoted for it, but it seems that the species has been lost to cultivators, and that *L. umbellatum*, a taller plant, is frequently grown instead of it. It was found by Catesby in the open parts of the moist Savannahs of Carolina. The bulb is small, about the size of a Walnut; the colour of the flower a rich mixture of red, orange, and brown, freely spotted with purple.

L. Philadelphicum is a noble Lily, common in Canada and North America, also found in Japan; was introduced into England in 1754 and flowered by Miller in 1757. It rises to a height of 1 ft. to 3 ft., and its flowers are yellow or orange, spotted with black, and occasionally blotched with red. It is one of our noblest and hardiest lilies.

**L. Kamschatiense* (Sarana) is a black flowering Lily, rather rare, but easily had through those in the trade, who make lilies a speciality, and worthy of introduction and general cultivation from its extreme novelty.

Lilium concolor (*sinicum*) is a rare brilliant scarlet Lily of great beauty, introduced from China in 1806, but still far from common in cultivation. There are also two varieties of this fine lily, *Coridion*, yellow with brown spots, and *Parthenion*, or the ladies' lily of the Japanese, a bright yellow and white variety, equally or more rare. These had better not be sought after except by Lily enthusiasts, as the prices of single bulbs range as high as one guinea.

Trumpet-shaped Lilies.

Eulirion Group.

*The beautiful European Lily *candidum* is known as *the lily* by every one, the Madonna Lily of the Italians, the Holy Lily of many in England, and the most popular lily probably in existence. The flowers are generally trumpet or funnel-shaped, horizontal or slightly drooping. Under cultivation *candidum* rises to about 2½ ft. to 4 ft. in height; has many leaves, especially round the base, and from 9 to 15 flowers. The season of flowering is from the end of February to the middle of July. This depends, how-

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ever, considerably on sight, soil and cultivation. The trumpet-shaped section of Lilies afford a long succession of flowers from June to September. There are several varieties of the common white lily, as L. candidum is generally called. None are, on the whole, more beautiful than the species, but all are useful, and as they are so hardy and easily cultivated, all the varieties should be grown.

**L. candidum flore pleno* is a double variety much prized by many, though by others the doubleness is held to take the poetry and sentiment out of the flower.

**L. candidum speciosum* is a smaller flowered snowy white variety. The purple-tinged variety of *candidum flore purpureo striata* seems to many the true species spoilt. Then there are at least four varieties which add colour of foliage to the simple beauty of the flower. An important addition has recently been made to this section in a variegated double-flowered variety, *L flore pleno argyrea variegata*. This is however still scarce and dear. The older and commoner forms of variegated leaved *L. candidum* are *fol aureo marginata*, with dark green leaves, edged with a golden band; *L. candidum fol aurea*, finely variegated and striped with gold; *L. candidum fol aurea maculata*, leaves richly blotched with gold, and *L. candidum, argenteo marginata*, leaves edged with white silvery bands. The foliage of these is so rich and distinct from that of all other variegated plants that they are worth growing for the leaves alone, while most of them flower as freely as the green leaved varieties.

** Lilium longiflorum*, and its several varieties, are among the grandest of all flowers in cultivation. The flowers are of immense size, pure white, and deliciously fragrant. It bears a strong resemblance to *L. candidum*, and is a native of China and Japan. The stem rises to a height of 1½ ft. to 2½ ft., and is stiff, erect, and glabrous. The leaves are numerous, flowers one or two, horizontal or drooping; perianth 5 to 7 inches long, pure white inside and out, with yellow stamens.

L. longiflorum eximium (*Wilsonii roseum*) one of the noblest, purest, and sweetest Lilies in cultivation. It is also the largest of the *longiflorum* section, though *L. grandiflorum** approaches pretty near to it in size. The position of this flower on the stem is also different from *longiflorum*. But practically the chief merit of the variety is its taller stem and larger flower. The habit is more compact and the leaves shorter, the flowers larger, sometimes 8 inches long; and the perfume one of the most unique and agreeable among lilies, having a large dash of orange blossoms in it.

**L. longiflorum Lin Kin* is a large pure white Japanese variety.

**L. longiflorum Takesima.*—Very large pure white flowers, which are rendered more strikingly beautiful by being placed on a dark coloured—almost black—stem—a very model of contrast.

L. Neilgherrense is a magnificent Lily, and may be called the Indian example of *L. longiflorum*. It is a native of the higher latitudes of the Neilgherries, about 8000 feet above the sea level. The stem is stout and strong, rising to a height of two to three feet; the leaves are more numerous and broader than in *L. lancifolium*. The flowers average from five to seven on a plant, measuring 8 inches to 12 inches in length, are deliciously fragrant, the prevailing colour being white tinged with primrose.

L. Wallichianum though more distinct from L. longiflorum than either of the other varieties or sub-species yet enumerated, may yet be not incorrectly described as the giant representative of that species from the Himalayas. It is worthy of its native site, being a giant among the Lilies of this section; a very prince among them all, not only for stature (from 5 ft. to 6. ft.) but for its fragrance.

**Lilium Japonicum Brownii.* This is a very noble and beautiful Lily, with a stem of from 2 ft. to 3 ft. in height, rounded and glabrous, with alternate numerous leaves scattered regularly over the stem. The flower is solitary, large, and beautiful, pure white within and slightly purple central vein outside. Some botanists consider it a distinct sub-species, and others as a luxuriant variety from the outgrowth of long cultivation.

**L. Japonicum Krameri* is a beautiful Lily, closely resembling *L. auratum*, but with neither spots, or centre lines; the colour is a delicate pink or light rose. Several new varieties of this fine lily are also now to be had, such as *L. Krameri album*, pure white; *L. Krameri roseum*, rose pink, very beautiful, and *L. Krameri rubrum*, a deep rose.

L. Washingtonianum is a sweet and noble Lily from California, where it abounds in woods, and thrives near the streams that feed the Sacramento river. It reaches a height of from 3 ft. to 5 ft., stem stiff, erect, glabrous, like the whole plant; leaves, which are 4 in. to 5 in. long and nearly ¾ in. broad, are arranged in whorls of from eight to a dozen leaves, placed at intervals of 3 or 4 inches on the lower part of the stem. The flowers vary in number from four to fourteen or eighteen, formed into a raceme a foot or more in length. The flowers are 8 in. or 9 in. broad when fully expanded, and from 2 in. to 4 in. deep, colour white, tinged with purple; sweet scented. There is also a purple variety of this noble lily, *L. Washingtonianum purpureum*. This lily, which does not seem such a strong grower as the species, changes to purple a few days after opening. These lilies are now becoming plentiful in commerce, and as there seems no lack of them in California, no doubt the growing demand for them will soon bring them within the reach of all at moderate prices.

DRACÆNAS.

The Dracæna is undoubtedly one of the most useful amongst the many beautiful foliage plants that are easily grown in this country, and yet, strange to say, they are not popular among amateur gardeners, but like many other good things they have been thrust into the background owing to the undue prominence attained by the Croton during the past few years in our Indian Gardens. Well, the "Croton mania" may now be considered amongst the things of the past, although it must be admitted that it dies a very hard death, and we trust that there is a good time coming when the many other fine foliaged plants now introduced into the country will receive the attention their merits deserve.

The present is a good time for propagating Dracænas both by means of roots and stems, where required in quantity. If struck now they will be sufficiently advanced to make fine well coloured plants before the cold season sets in, at which time they will be found very useful for table and other decorations. For propagation purposes choose plants that have grown tall and leggy—the taller indeed the better, as the stem will then cut into a greater number of pieces. In the first place cut off the top of the plant, and put it in as an ordinary cutting, leaving sufficient stem attached to it to form a base, and do not remove too many leaves, or when rooted it will have to be grown on for some time before it becomes effective; whereas if struck with as many leaves as possible as soon as it is potted, it becomes a good dwarf plant. The tops should be placed in small well-drained pots in a compost of two-thirds coarse sand and one-third good loam well mixed up together. It will be necessary to stake any of them that may be top heavy. After potting they should be kept in a glass case or frame, and kept as close as possible, when they will soon root. After that they should be hardened off without delay and shifted into larger pots. Another way, and one often followed, is to put new cocoa-nut fibre refuse in the case or frame and in it insert the cuttings instead of putting them in pots; but where this is done, they will require to be kept close for a few days after being rooted and potted, just to give the roots a start in the new compost. When the tops are taken off they should be thoroughly cleaned before putting them in the case or frame, as, if there be but a few insects on them in the confined atmosphere in the case, they will spread rapidly. Cuttings of the stem may be put either in a close case or in pans or pots. Cut the stems up into lengths of 1 in. to 2 in., and the thick fleshy roots into rather smaller pieces; this done, lay them in rows in cocoa-nut fibre, leaving about half an inch between each row of stems, and when so placed cover them to the depth of one inch with fibre, levelling it down, when all will be finished. Give water very sparingly for the first few days, as any excess of moisture will cause many of the pieces to rot. The young plants will soon push up freely from every joint, and when they have made four or five leaves they should be removed from the parent stems. Most of them root quite independently of the old stem, and if cut off carefully

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can be at once potted, when, if kept close for a few days, they soon become established. The old stems can be laid in again as before, when they will push into growth, but only weakly or irregularly as compared with their first effort.

Stem cuttings of Dracæna Goldieana or Lindeni will not grow, but these may be propagated in this way: when the plant has attained a sufficient height take off the top and put it in as a cutting; after a time the old plant will push out another shoot from the bud immediately below the cut part, which when strong enough may be cut off and treated as the top. The rate of increase by this method is slow as compared with stem propagation, but is useful in the case of kinds that grow but with difficulty from eyes, such as D. congesta, gracilis, excelsa, &c. Where a plant has a very fine crown of leaves, and it is desired to strike the top with as little risk as possible of losing them, a ring of about ½ in. to 1 in. of the bark should be removed at the height required, and some moss should be bound around which must always be kept moist. If done in this way the top need not be separated from the parent plant till it pushes roots into the moss, when it should be taken off and potted.

SEASONABLE NOTES.

THE FLOWER GARDEN.

Planting—Where any alterations in grounds or gardens are contemplated, the present is the most suitable time for making them. In selecting trees and shrubs it is necessary to take into consideration their habit of growth and the form they are likely to assume when they are fully developed, and whether they will be of an upright or drooping habit, or of a round-headed or pyramidal form, &c., and with a view to secure the desired effect in grouping or arrangement, the hue and form of leaf should also have attention given them. There is also another very important point which should not be lost sight of, *viz.*, that of selecting plants that are likely to thrive in the soil and situation where it is intended they should be planted. In the case of newly introduced species this can only be ascertained by experiment, and this will generally be upon a somewhat limited scale. The nature of the soil will considerably influence the mode of procedure necessary in moving any plants that have attained a large size, in strong adhesive soils that will hold together, so that they can be moved with good balls. These should be kept intact as big as the means of moving them will allow, and the roots beyond such balls ought to have the soil from around them carefully removed so as to secure as great a length as possible, for upon the amount of the smaller fibres that can be retained will, in a great measure, depend the progress the plants will make after removal. In all cases where large plants of this description have to be moved, the holes in which they are placed must be made wide enough not only to admit the ball but also to allow the roots that extend beyond it to be laid out straight, and not twisted round in the unnatural position often done by careless planters. As the soil is being filled in the roots must be well drenched with water; if this be given now in sufficient quantities no more will be required, as the plants will at once commence to grow. In light ground it generally happens that very little soil will adhere to the roots, in which case it is still more imperative that as great a length of root as possible be secured. Shrubs that have attained any size, and have to be removed in such soil as this, will require more support to protect them from the winds after re-planting than those that can be moved with a good ball. In the case of smaller plants that are to be shifted proceed as recommended for the larger ones; with these as with the others the more roots that are retained with the least mutilation, the less check will they receive. In preparing ground for the planting of trees and shrubs no labour should be thought too great; for the reason that when this is well done at first, the plants not only start off vigorously, but no other disturbance or addition to the soil is required for years, therefore trench deeply and manure liberally for even the commonest shrubs.

Draining Lawns and Walks.—The heavy rainfall of the present season has been such as, in the case of lawns and pleasure grounds, to show where any defect or deficiency in the way of drainage exists; and where work of this nature has to be done, there is no better time than the present for carrying it out. Here, as in the other parts of the garden, the depth to which the drains should be cut must be regulated by the character of the soil. On lawns where the soil is retentive enough, open material, such as clinkers, brick-rubbish or burnt clay, should be placed over the sub-soil pipes in such quantities as to fill up to within 10 inch or 12 inch of the surface. By this means water will much more quickly find its way into the drains. The necessity for removing all stagnant water, consequent upon badly drained walks, is equally pressing. It frequently happens that, however well such work has been done in the first instance, the drains get choked up in course of time by the roots of trees, &c.

Walk-making.—It is very common, especially in small gardens, to see the walks so badly made as to render them soft and incomfortable after any considerable amount of rain has fallen. This generally arises from the material used having been spread on them without care, rough and fine being indiscriminately mixed together. Where such a state of things exists, the best way is to begin at one end and sift the whole over again, passing it first through a 1½ inch meshed riddle, and afterwards through a second of ¾ inch, putting the largest at the bottom, the second size upon them, and the finest on the surface. By this means one of the greatest comforts in a garden may be secured—an efficient path, through which the water will quickly penetrate, leaving the surface dry and pleasant to walk upon.

Lawns should be well swept to remove all worm-casts, and where necessary rolled previously to being mown, for although most machines profess to roll as well as cut the grass, yet if mowing be attempted where the ground is full of worm-casts without their being previously removed, a single operation will do more to injure the cutting capabilities of any machine than a dozen mowings when the surface is free from grit. The existence of moss on lawns is produced in two ways—a wet condition and extreme poverty of the soil caused by exhaustion resultant from continuous mowing, and the non-supply of enriching material to enable it to afford nourishment to the grass. Where moss exists from the latter cause, a dressing of lime and ordinary loam (one part of the former to three parts of the latter) scattered on about one inch in thickness, will be of the greatest benefit in destroying the moss and promoting the growth of the grass.

Chrysanthemums will now require attention. The earliest plants that were propagated in January will now be ready for their blooming pots: those struck later in the season should be shifted on as they require it. Every encouragement should be given to promote vigorous growth, as the secret of success is to get them well established and the growth thoroughly matured, which cannot be done if they are left to make it later in the season. Although of a gross feeding nature, it is not (at this season especially) advisable to use a very rich soil, good fibry loam with the addition of one-fourth or one-sixth of very old cowdung being the best and most suitable, as what stimulants they require can be given later in a liquid form when making and developing the buds. To keep them healthy however, with foliage down to the ground, they must not be stinted for water, as their requirements in this respect are greater than most plants, and it will be found that in dry, hot weather they will often need it twice a day. Plunging the pots in some non-conducting material, such as leaves or cocoa fibre refuse, is a great saving, as it not only prevents the sun and heat beating against them, but it keeps the roots in a comfortable condition, free from sudden changes so inimical to their welfare. The greatest danger, however, at this season of the year is from heavy, continuous rains. Many growers adopt the precaution of placing their plants in a verandah or other sheltered position, and if carefully attended to and light and air freely admitted, they will thrive very satisfactorily. We prefer, however, to keep the plants in the open air, selecting a well raised, slightly shaded position, arranging the pots on a bed of 2 to 3 inches of coal cinders or ashes, placing over the plants a light bamboo frame work which is used to support common rush mats (*hooghlas*). These are used only during very heavy rains, or

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if we have a break of very hot weather, the plants are shaded for two or three hours in the middle of the day.

DOUBLE ZINNIAS.—There is generally a paucity of gay blooming plants at this season, and although Zinnias are not generally cultivated in pots, they are most valuable for that purpose, their gay colours and fine, large globular flowers making quite a display long after they cease blooming in open beds, where excess of damp and heavy rains sometimes cut short their beauty. Any left over from planting should have their flower buds nipped out and be potted up at once, after which set them in the shade for a few days till they get hold of the soil, and then place them in an open situation. A few seeds sown now will not be too late, as they grow rapidly at this season and soon come into bloom.

CYPERUS ALTERNIFOLIUS.—The variegated form of this plant is usually liked the best, but the green kind is also worth growing, although not so showy. Both are most useful when in small pots, 6 inches or 7 inches in diameter. The present is a good time for dividing any that have got too large, turning them out of the pots, separating them so as to leave two to three crowns in each. The variegated sort generally keeps its colour best when grown in loam. The plants, as soon as they begin to grow, should be kept in a light airy position, as this tends to preserve the variegation and keeps them stouter.

PROPAGATION.—Continue to strike cuttings of foliage and flowering plants as recommended in our last issue.

THE VEGETABLE GARDEN.

The only work in this department is to continue to make sowings, at regular intervals, of Brinjals, Ochro, Cucumbers, and the various kinds of runner Beans and Gourds.

Jerusalem Artichokes, Arrowroot, Turmeric, and Ginger, that were planted early, will now require to be earthed up.

All vacant ground should now be turned over, leaving the surface as rough as possible. The oftener this operation is performed during the next three months the better condition will the ground be in, for planting in October.

THE FRUIT GARDEN.

Peaches, Plums, and the various members of the Orange and Lemon family may now be budded successfully.

Lichees, Star Apples, &c., should now be propagated by Gootee; Mangoes also may be grafted.

The present is a favourable time for forming young plantations of Fruit trees.

LONDON OFFICE

OF

THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

1, Whitefriars Street, London, E. C.

Correspondence.

(TO THE EDITOR "INDIAN GARDENER".)

Rangoon, 22nd June.

DEAR SIR,—What do you think is the value of the following as compost for Roses in pots:—½ Loam (good), ¼ Powdered Charcoal and old leaf mould, ¼ old cow-dung.

Yours faithfully,

ROSARIAN.

Except under very exceptional circumstances, we should not recommend leaf mould for Roses. Instead of this give more loam, or, say, a compost made as follows:—Eight parts loam, three parts old cow-dung, and one part charcoal broken into pieces about the size of marbles. The latter will be found much more effective than when it is reduced to powder.—ED., *I. G.*

ANSWERS TO CORRESPONDENTS.

ROSES EXUBERANT *(L. T.)* Thin out the growths if crowded, retaining all the stout, short-jointed wood, removing those that are very sappy on the one hand and weak on the other. By thus admitting light and air to the foliage you will aid in maturing the growth; do not, however, cut back the shoots that are left as you suggest, as this would have the effect of inducing the plants to produce a lot of weak lateral growth, which would effectually destroy all chance of the plants blooming well next season. If you do not prune the plants too closely in the autumn, you will probably have fine blooms next year, but close pruning, such as you have hitherto practised, will result in strong and perhaps flowerless growths.

GUANO *(B. C. F.)* A solution of one ounce to the gallon of water will be found sufficiently strong for the class of plants you mention, in fact for almost every description of hard-wooded plants: "little, and often," should always be our maxim in using this or any other kind of liquid stimulant.

MANGOES *(Pomona)*. The present is the most favourable season for propagating these: there is no method equal to the old native style, that is by approach grafting. We have frequently heard of, and have in fact seen, plants propagated by budding, but it is a tedious and uncertain process, the buds generally remaining dormant for at least six months. At least from two to three years are lost as compared with the former method.

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

COLOUR EFFECTS IN GARDENS.

When the bedding system first came into vogue, it was no doubt the extreme brightness, or what we should now call gaudiness, that for a time caused it to hold the position in popular favour that it did. But, like every other hobby that from time to time takes possession of the gardening fraternity, it was soon done to death, as anybody with the least perception might have foretold would be the case, seeing that only scarlet Geraniums, yellow Calceolarias, blue Lobelias, or purple Verbenas were used, and, by way of a change, the following year there were Verbenas, Calceolarias, and

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Geraniums, the constant repetition of scarlet, yellow, and blue being nauseating even to those who had little of no taste whatever in gardening matters, whilst others with finer perceptions of the beautiful began to inquire for the Parsley bed, by way of relief. As a matter of course, such an unsatisfactory state of things could not continue; but yet the system could not for several reasons be given up—a very good one being that the great bulk of hardy flowers had been ruthlessly swept out of the garden to make room for bedding plants, and so, gardeners being, as it were, in desperate straits, the developing of the bedding system began, foliage plants of various colours being mixed with the flowers. Then followed standard graceful foliaged plants, hardy carpeting plants, and now dwarf and formal-growing shrubs are being used freely in association with the commoner types of bedding plants; indeed, the improvement both in taste and arrangement, as well as in variety of plants, has been so rapid that the most relentless opponents of the system have—reluctantly, it may be—admitted that the system has some redeeming qualities, and has certainly given a great impetus to horticulture in general; but I think that the strongest reason of all for its retention is the suitability of it to formal or geometrically designed parterres.

Perhaps the general re-action now going on in favour of hardy herbaceous perennial plants may quite oust the system, but whether it does so or not, so long as it is practised, the question of colour must ever be of paramount importance. Most people have their own notions as to what constitutes perfection of colour in bedding arrangements. This the writer has not attained to, nor is he certain that he has any decided preference for one colour over another, but he has very decided notions as to arrangement of the various colours, which are, that the whole shall be so completely commingled as to be puzzling to determine what tint or colour predominates in the entire arrangement. This rule he has followed for years, and has had a fair amount of success in the working out of it, but is still learning, the latest lesson being that if any colour at all may predominate, it is what gardeners know as glaucous, that is, a light grey or whitish green. Of such a colour the eye never tires, perhaps because it is in such harmony with the predominant tints of the landscape, and particularly of the lawn.

To successfully carry out the rule as to arrangement of colours here advanced, there are other, what may be termed collateral, rules that must be studied, the first being that high colours, such as scarlet and yellow, must be used much more sparingly, that is, in less proportion than colours of softer tint, for the obvious reason that these colours overweigh, as it were, all others; secondly, there must be no violent transition from one colour to another; the contrasting of colours must be avoided as much as possible in favour of the gradual intermingling or harmonising of colours; thirdly, the most decided or high colours, being the heaviest, ought to occupy the most central position of beds, or else be distributed in due proportion over the entire garden, to ensure an even balance of weight throughout; and, further, when dealing with such colours, just to use them in necessary proportion, and no more, and, if to err at all, to take care that it be on the side of niggardliness. By close adherence to these rules, the writer has for years had no difficulty in producing harmony of colour that has worn so well, as to be just as welcomely viewed at the end as it was at the beginning of the season, for the quieter the colouring the more lasting is the enjoyment of it. And it is pleasant to observe the great advance yearly made in favour of what may be called neutral or the quieter tints; gaudiness, as applied to bedding out, being now the exception rather than, as was the case but a few years back, the rule.

To fully carry out the ideal of colour here advocated, a great variety of plants is needed, but not more than in gardens where bedding out is practised; but, lest the owners of gardens of smaller dimensions may think it an impossible attainment in their case, it may be well to add that there is colour and colour, and that if they cannot, owing to lack of appliances, &c., for raising plants, have elaborate designs and variety in colour, they may have an equivalent in the way of graceful foliage and beautifully tinted shrubs of varying hues and habit, from deep green to bright yellow, conical, weeping, and feathery. Retinosporas, Cypresses, Yews, Yuccas, and many others not only associate well with all kinds of bedding plants, but with their congeners in hardiness—the various kinds of hardy Sedums. Saxifrage and Veronicas, and these are all within the means of the most utilitarian owner of a garden, and might be arranged in bedding out form, the shrubs for centres and panels, and the dwarf hardy plants for massing and carpeting. Such a garden, though somewhat sombre in colouring, would be infinitely more interesting and pleasing than if it were planted after the orthodox fashion of bedding out.—*The Garden.*

NEGLECTED INDUSTRIES IN INDIA.

TO THE EDITOR OF THE "PIONEER."

Sir,—I venture to send you the following lines, with the hope that some good may come of them. For want of a variety of openings for the employment of capital, one has often seen tea companies started and competing with other companies, with the result of lowering and perhaps ruining, the profits of all. Coffee and cinchona plantations have been started in numbers, and are destroying each other's profit. The same occurs with cotton and other mills, cotton screws, &c. No sooner is an industry set up and is found to give a fair profit to the shareholders, than capitalists rush in and spoil, not only the profits of the pioneers, but also their own; while other and new industries, which might give a profit to capital, are neglected. I shall here mention a few industries which I think might use up the capital of one or more companies with profit. There are now in India two imported plants, which I introduced many years ago. Both of these grow like *weeds* in almost any part of India, except where severe frost occurs. These are (1) the Malta lemon tree, *Citrus Limonum vulgaris* of Risso; and (2) the Seville orange, *Citrus Bigaradia* of Risso. Both can be propagated to any extent by budding on the common *khatta* stock, by layering, and by seed. Both could be easily attended to by women, children, and the cheapest labour. In any temperate part of India, where the *kaghzi nimboo* grows, these will grow, requiring only irrigation during the hot, dry months. For the actual cultivation little skill is necessary beyond that of a common *mali*. For working up the produce one or two skilled foremen from Europe would at first be necessary. The industries resulting from these two delightful plants are the following:—From the Malta lemon: The rind is made into candied lemon-peel, or is pressed for its essential oil, called "essential oil of lemon-peel." The latter is used in pharmacy, confectionery, perfumery, and for flavouring effervescing lemonades. The rind, pulp and juice all together, boiled with sugar, make a first class lemon jelly, superior to marmalade: the juice alone of course is turned into citric acid. This is used in pharmacy, confectionery and for making acidulated effervescing drinks. But its great future in India would, I think, be for the preparation of citrate of iron and quinine, the one tonic needed for picking up the fever-stricken population after being weakened by malarious fevers. From the Seville orange: The rind, pulp and juice are made into marmalade of the first quality. The flowers, the finest scented of all the orange tribe, are distilled for their essential oil, called oil "neroli." It is also extracted by "enfleurage." This oil is used in pharmacy, perfumery, &c. The distilled water, after the oil is removed, is the "orange flower water" of commerce, used in pharmacy and confectionery. From the leaves, which are highly scented, another essential oil, called "petit grain," is distilled, and is used principally for scenting ordinary soaps. The Indian lime, or *kaghzi nimboo*, might also be utilised for its acid, and it can also be made into lime-jelly! The reader may perhaps think that these are trifling notions, but considering that Moir & Co. alone have *three steam factories* in different parts of Europe making marmalade from Seville oranges, I need hardly say that these notions are not, after all, so trifling as they would at first appear. Cheap sugar and cheap fuel would of course be important items in these industries. It might be said that it would be cheaper to get all these products from Europe. So it was said, years ago, that it would be cheaper to carry cotton to England from India, and bring it back as manufactured articles, than it would be to work it up in India. Nevertheless there are several mills in Cawnpore, and many on the Bombay side and other places, which, if worked at all, can only be worked at a profit. It might be also said that the demand for such products in India would not be enough to support these industries. Let us see. All Europeans, in India, including soldiers, are fond of cakes, as also the whole of the Eurasian

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population; and cheap candied lemon and orange peel would find a sale among them. This, however, is one of the minor products. All Europeans and Eurasians are fond of effervescing lemonades. These *ought* to be made with citric acid flavoured with "lemon oil." Now, however, as imported tartaric acid is cheaper than citric acid, so-called lemonades are really tartarades. And the flavoring, with few exceptions, is probably *nowhere*. As teetotalers increase, the consumption of effervescing lemonades, if nicely made, will also increase. Marmalades are now perhaps only used by Europeans who can pay for them. But, if sufficiently cheap, both marmalade and lemon jelly would be used by most Europeans, including soldiers, and also by most Eurasians. Cheap scented soap would be used by all Europeans and Eurasians. As to citrate of iron and quinine, who in this country would not be glad to have it cheap? It is one of the best tonics to renovate the blood after malarial fevers. The above is as far as India alone is concerned, but then there are other markets to which these products might have access. Of this I am certain, that beyond the necessary land and facilities for watering the trees, *growing them would present no difficulty whatever*. They can both be made to grow like any indigenous tree, and with proper cultivation they will flower and fruit abundantly. These two trees give their main crop of flowers in spring, and ripen their main crop of fruit in December. But at odd times they flower and produce what natives call "dumrez" fruit, which ripens at intermediate times, so that practically they bear fruit *all the year round*, but produce their *main* crop in winter. Bangalore has a Mediterranean climate, and would probably suit these trees well. His Highness the Nizam's territories have remarkably rich soil, and these plants are almost certain to thrive there. It would appear that orange and lemon trees like lime in the soil, the orange tree wood giving in its ashes no less than 45 *per cent of lime*, according to Liebig. In the *Pioneer* of the 5th February last, the now famous pundit is made to say that in Tibet, in the valley of the Zayul, at an elevation of 4,500 feet, he saw the lemon and the plantain growing. This, however, I know, that in *Rome* the lemon tree is often killed by frost, and in Florence they grow it in big *nands*, and house it in winter. In Naples and Sicily it grows abundantly. The history of the introduction of the orange and lemon in Europe points to their having been taken there by the Arabs, and that they came from India, or from some place beyond the Ganges, so that their home is either in or somewhere near, India. I have little doubt that on the southern slopes of many a Himalayan valley the orange and lemon trees would find many places, with a quasi-Mediterranean climate, excluding, of course, the sea. In or near Sylhet the orange is probably indigenous, or has been grown there from time immemorial. Calcutta is supplied with oranges from Sylhet. Why could not the Sylhet orange be grown for its fine fruit in the same plantation with the Seville orange and the Malta lemon, for their own special products, so that the planter would have "several strings to his bow?" In Lucknow the Sylhet orange grows remarkably well. In Delhi the Cintra orange grows famously. In Nagpore a fine orange is grown which supplies Bombay with this fruit. Wherever any orange or lime will grow, the Seville orange and the Malta lemon will grow equally well. Finally, I need not say much about Kashmir, which is *par excellence* the land of fruit. As to the occupation, what could be more charming than growing oranges and lemons; making jams and jellies; and distilling essential oils? The planter has a choice of the plains or the hills for his operations; nor is it necessary that the manufacturer should be also the grower of the raw materials. Mill-owners do not grow their own cotton, wool or fibre; sugar refiners don't grow their own sugarcane; and rarely do indigo-planters grow their own plant. Recently Lord Wolseley has been chaffed in many papers for ordering marmalade for the Soudan Expedition. It is understood that lemon juice or citric acid is one of the best anti-scorbutics known. Both in the Army and Navy it is largely used, and I believe the way it is usually administered is to have a parade of the men two or three times a week, when fresh vegetables cannot be obtained, and each man is made to swallow a measure of acid juice. To observe the faces of the men as the bottle moves down the lines, would be enough to show that it is not a very pleasant draught. To tell the truth, if I had to take citric acid, I would prefer taking it in the shape of marmalade or lemon jelly, at breakfast time, with either bread or biscuit, and without making faces. I doubt not that both soldiers and sailors would prefer them also, to the orthodox lime-juice. As to bulk, there would not be much difference, as a larger portion of the lime-juice is nothing but water. Instead of the latter, the marmalade and jelly have sugar, flavoured with the rind of the fruit. But in the event of soldiers preferring lime-juice, pure and simple, there would be no difficulty in manufacturing that also. Possibly these hints may not be without result to some Anglo-Indians who "do not know what to do with their sons." It is no longer a question of making *fortunes* either in India or anywhere else. The urgent question is how to earn a *decent comfortable living*. When we find gentlemen's sons either enlisting or accepting the posts of railway guards with the hope of future promotion, the road to fortune-making must be well nigh blocked up. Those who have read what the Americans are doing withthe orange in Florida will understand how much there is left undone in India with regard to these wonderful trees. There are not perhaps many persons who may have tasted Seville orange marmalade pure and simple, as the demand is larger than Seville and other places can supply; and therefore the commercial marmalade is not likely to be "pure and simple." Marmalade made at home from pure Seville oranges, and simply boiled with sugar, is truly delicious. Hitherto the orange and lemon trees in India have been left in the hands of natives only, and a few horticultural gardens. There are few trees that repay the cultivator in fruits and other products so well as the orange and lemon trees. They do not merely give a moderate crop every second year or so, like the mango tree, but are *laden* with fruit year after year, and sometimes all the year round. In order to get this, however, they must be regularly fed and watered at the proper season.—*E. Bonavia, M. D.*

VEGETABLES.

It is certain that Queen Elizabeth never took coffee at her breakfast, it is most improbable that she ever tasted tea. What she had for dinner we can only guess, but it is not likely that her English subjects had much variety of vegetable food. John Bull was always a great beef-eater. The dramatists of that palmy period of English literature tell us a great deal about eating and drinking. Shakspeare has plenty to say about venison and capons and beef. He says very little about vegetables. We have the line "And greasy Joan doth kele the pot," that is, put kele into the pot—kele being the colewort of the Saxons who called the month of February Sprout-kele as the time when their great potage herb began to sprout, and we have some few other such allusions. But it would seem almost as if vegetables had not yet made their way into the national diet. Yet there is no evidence that indigestion was a common malady. Our present doctors say, that we eat too much meat, and too little vegetable food, and hence dyspepsia. In Queen Anne's time they had "vapours," but then they had vegetables also. The truth is that most of our vegetables were importations. Travellers supplied them to us. Envoys returning from foreign Courts brought us the account of them as they were used in the capitals they had visited. Exiles compelled to live in England introduced the fashions of their country and taught us lessons in cookery. It is unfortunate, says Goldsmith, that the French have not good butcher's meat; for they can make thirteen dishes out of a turnip top.

Nearly all our vegetables came to us from the Netherlands. Our commerce brought us into constant relations with the Spaniards and the Italians and of course with the French; but it was Belgium and Holland that first supplied us with vegetables. And, moreover, it looks as if there were a sudden move in that direction. Of course there were certain vegetables that were always used—cabbage, for instance. Still, even in the case of cabbage, the finer kinds were introduced by Sir Arthur Ashley of Dorsetshire, on his return from Holland in the year 1510. These were cultivated with varying success, and this better kind of cabbage only made its way into Scotland with Cromwell's soldiers. About the same time that we got cabbages we got carrots—Holland and Flanders being the exporting countries; and a dozen years after, the carrots, lettuces made their appearance in England, their origin also being Dutch. Of course it was not that Holland alone of European countries enjoyed a salad; but that market gardening was brought to earlier perfection

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there; where the people had few manufactures and the irrigation of their nursery grounds presented no difficulties. Holland also was our nearest neighbour, except France, with whom we were generally at war. Two other vegetables we owe to the same country. We had our first cucumbers from Holland, and they did not reach our shores till 1538. Celery came to us more than a century and a half later. Marlborough defeated Marshal Tallard at Blenheim; that general spent a period of captivity in England; and the English owe to him the introduction of celery. But war has often before been the herald of cookery. Alexandre Dumas used to tell his guests with great gusto, the history of a pheasant *a la Soubise*. Soubise was a famous French general who was worsted in one of Louis XV.'s campaigns. He fled from the battle field and took refuge at a peasant's cottage, where dinner was being cooked for the family. The dinner was a pheasant, and the cookery was peculiar. Wearied and hungry, the Marshal thought he had never tasted anything so good; and having dined, got paper and pen and ink, cross examined the peasant's wife, and committed the recipe to writing. At that moment two of his aides-de camp entered the cottage. They too were fugitives from the battle field, which was now a scene of hopeless rout. "See," said one to the other, "how great a man he is that even in the hour of disaster he should be organizing route for his army and planning a fresh campaign." They had not then heard of a pheasant *a la Soubise*. The Marshal returned to Paris, dishonoured and disgraced. He would not be received at Court, and became the object of a thousand malicious epigrams. Some friends were staunch to him, and one great lady, who was also a favourite of the King, he still numbered amongst as his friends. She tasted at his house a pheasant cooked after the memorable receipt. It was excellent. The fame of it went through the city. Every one was talking of this Soubise sauce; but the secret was kept. Jealousy and malice were strong with French courtiers; but the desire to taste the new sauce was stronger still. Various overtures were made; but the Marshal was resolute, or at least was reticent. Ultimately it got to be understood that if polite society wanted the sauce it must accept with it the soldier. The dish was too alluring, and the Marshal was restored to favour. The prime factor in Soubise sauce is no longer a secret; and if the onion is not so popular with us as it is with the French, it certainly has lately grown in esteem. From time immemorial it has been cultivated in Egypt, and it was always a great favourite with the Germans. There is a very familiar pattern for the decoration of blue-and-white Dresden china. It is universally admired, but very few people know that it is an imitation of the onion-flower. Indeed, the Welsh onion comes to us not from Wales but direct from Germany. The adjective that seems to suggest topography should be *Walsch*. Garlic still grows wild in Sicily and some parts of Provence.

Asparagus is really a kind of lily, but was known as a vegetable as far back as the time of the Romans. Pliny mentions the asparagus of Ravenna with especial praise. In the south of Africa it is a weed. But the strangest surprises are in store for any one who cares to examine the near relationship of vegetables that to a gourmand (who does not happen also to be a botanist) seem wide as the poles apart. Almost the best illustration is that of the common cabbage and of the common turnip They belong to the same family, and are, so to speak, first cousins. Though the cabbages we use are imported, the wild variety grows all over Europe—in great plenty about Mount Athos, and in scarcely less abundance in our own home counties. The wild turnip is also indigenous, though scarcely so free in its growth. We may take another illustration from the tomato, which is almost a recent addition to the English cookery-book. France, Germany and Italy knew its use and took advantage of it many years before we did. The French employed it chiefly as a sauce. The Italians eat it *au naturel*. That extraordinarily rich district through which the train from Rome passes just before it arrives on the outskirts of Naples, is almost entirely devoted to the cultivation of tomatoes. You pass through fields and fields covered with it. The Italians had a kind of prescriptive claim to it; for one of their countrymen discovered the land from which it was introduced into Europe. The tomato is not only of American origin, but belongs to the same family as the potato.

It appears then that nearly all the vegetables we use have come to us—or at least their use has come to us—from the Continent. We took most of them from the Dutch or the Germans, though the wild varieties of many were at the very time growing on our own soil. And still the Continent supplies England, or at least London, with vast quantities of vegetable food. The cause is partly climatic and partly due to the prevalent desire to eat things out of season as well as in it. We get vegetable-marrows from Spain, peas from Italy, lettuces from Belgium, and almost every kind of vegetables from the Channel Islands. These are the first-fruits of the year. But there are no better vegetables than those of home growth. In Covent Garden, English produce ranks high above all that the Continental markets produce; and, with all the advantages of soil, climate and cheap labour, no country can give us a dish of peas comparable to our own marrow-fats.—*St. James's Gazette.*

MULCHING TREES AND SHRUBS.

A. S. FULLER.

A very noted English arboriculturist says:—"Mulching consists in laying a circle of litter around newly-planted trees to retain the natural humidity of the soil." This is certainly a very brief and incomplete description of both the operation and the benefits to be derived therefrom. It is, however, about as much as has been claimed for it by tree-planters in this country, and for these and other reasons comparatively few persons think that mulching trees is sufficiently beneficial to pay for the cost of material and its application. To say that the material applied as a mulch is merely "to retain the natural humidity of the soil" is certainly claiming very little for one of the most beneficial operations which the tree-planter can practice, especially in all hot and naturally dry climates, or in one like that existing throughout the greater part of the United States.

There is seldom a summer during which we do not have a drought, extending from a few weeks to months, and during the dry weather the temperature ranges high, and hot winds sweep over the earth's surface, causing rapid evaporation of moisture therefrom. Even in seasons when there are no protracted droughts, there is seldom a superabundance of moisture in either the air or soil. Of course we are speaking of good, arable lands and not of swamps and bogs. In the older States, where the forests have been in great part destroyed, as well as in the prairie region of the West, the securing of sufficient moisture to insure the lives and healthy growth of trees and shrubs is a problem engaging the attention of all fruit-growers and arboriculturists. It is true, as usually claimed, that in mulching trees we seek to keep the soil moist nuabundant element in plants is carbon, and forms from forty to fifty per cent of all plants usually cultivated for food for man or domestic animals. When wood is charred the carbon is left—common charcoal being an impure form of this substance. Carbon is insoluble by itself, but when united with oxygen in the form of carbonic acid, it is readily taken up, either in the gaseous state by the leaves of plants, or in combination with water and air by the roots. Carbonic acid is always present in the air, averaging about one part in two thousand, and in a humid atmosphere the quantity is much greater than in a dry one. Professor Normandy found that while a dry atmosphere contained only one part of carbonic acid in four thousand, the air held in solution in water contains from forty to forty-two per cent. of carbonic acid, and from this we can readily understand how the air carried down to the roots of plants, supplies an immense amount of material for building up both roots and stem. Ordinary rain water contains on an average, fifteen cubic inches of oxygenized air per gallon, and about six per cent of this is carbonic acid. If the surface of the soil is kept open and porous by frequent stirring, the water, falling upon it at the time of summer showers, goes down to the roots with its carbonic acid and nearly four per cent of nitrogen—both, very important elements of nutrition. Cultivated soils admit water freely but as is well known, heat expels air from water, and with it much of the carbonic acid which, for the benefit of the plants, had better be retained, where it is likely to do the most good. When the surface of the ground is fully exposed to the direct rays of the sun, it becomes very hot, especially in warm climates, and the result is a rapid evaporation of moisture, air, and the important gases named. By covering the surface with some kind of loose, fibrous material, we not only facilitate the admission of air and moisture, but prevent the rapid evaporation of the latter at a time when the plants need it most, and the elements which go to make

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up the greater part of the bulk. It is claimed, that plants both absorb and exhale carbonic acid through their leaves, but the amount must be infinitessimal in comparison to the amount taken up by the roots, for were it not so, the husbandman would only need to hang a few bottles of certain kinds of gases in his orchard or fields, to insure himself a good crop. But we know that something more substantial is required, and we are compelled to plow, harrow, and hoe, and add various kinds of fertilizers to the soil when it loses its natural fertility, else crops fail.

We have only to look into any of the great forests, to see the effects of continued and thorough mulching, without cultivation. Carbonaceous matter abounds both in and on the surface of the soil, and it is in such a loose and open condition, that aerated water can enter freely with whatever elements of fertility it may contain; and further, the oxygen of the air attacks the insoluble carbon, and combining with it, forms carbonic acid. thus assisting in the nourishment of plants, and especially that of the trees and shrubs.

In mulching newly planted trees, or those set for some years, we not only prevent suffering for want of moisture during the dry weather in summer, but enable them to obtain those elements, which they require for nourishment and growth. In selecting a material for mulch, one of the fibrous nature, or at least one that will not become compact and hard, after being beaten some by heavy rains, is always preferable to any other. The more plant food the material contains, the better, and for this reason coarse litter from the stable or barnyard has no superior for this purpose. Meadow hay may be ranked next in value, then straw, corn stalks, bog hay from low lands, and thence downward in the scale to pine or basswood shavings and sawdust. Almost any material that will shade the surface of the soil and admit air and water, will prove of great benefit to newly planted trees and frequently restore to health the old and feeble, or those stunted in growth from lack of moisture at the roots, and those fertilizing elements that can only be absorbed and utilized when presented in a liquid or gaseous form. Even small stones may answer.—*American Agriculturist.*

THE GRAPE IN CALIFORNIA.

It is difficult for any one to form an adequate idea of the magnitude of Grape growing in California from any written description. The enormous vineyards must be seen in all their vastness to fully comprehend them. Mr. Wetmore, one of the best California authorities on the subject, estimates that in 1885, 70,000 acres of vines were in bearing. The vintage for 1881 was 12,000,000 gallons; in 1882, 9,000,000 gallons and in 1883, 9,500,000 gallons.

To Los Angeles County belongs the honor of being the first in age and extent in Grape growing, the Mission Fathers planted cuttings brought from Spain, and made wine over a hundred years ago. Large quantities of Grapes are raised for shipment to the Eastern States, the Muscat of Alexandria, Muscatelle, Flame Tokay, Black Morocco and other foreign varieties being planted for this purpose. The rare varieties of Grapes grown when placed on the Eastern market command high prices, though the vineyardists of Los Angeles County can afford to sell their Grapes at $20 to $30 per ton, and with the cheap competition freight rates East, the fruit can be placed on the market at a price which will make them staples rather than luxuries.

The year 1885 was not a prosperous one for Grape growers in California. The San Gabriel Winery probably the largest in the world, with a capacity for crushing 250 tons of Grapes daily through the season, turned out in 1884. 350,000 gallons of wine and 50,000 gallons of brandy; while the product of last year was about two-thirds as much. The Grape industry is growing rapidly in California, and the time is not far distant when she will prove a formidable rival to Europe in the production of fine wines. —*American Garden.*

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Editorial Article.

LANDSCAPES BY EXPRESS.

It was with considerable regret that we ventured, in a previous article, to advocate the removal or destruction of old trees, badly placed, from landscapes which they narrow or mar rather than enrich or adorn. But injudicious planting has been by no means confined to our remote ancestors, and hence in numerous places there are quantities of young or middle-aged TREES IN THE WRONG PLACES that may easily be transplanted into the right ones. This is far more pleasant work than the removal of old trees, as it leads to little or no destruction of arboreal grandeur or beauty, but simply to its richer and more effective display.

The theory of the irremovability of trees has been carried too far. No doubt a large degree of fixity of tenure is essential to their well-being; but it is by no means impossible to remove trees of very considerable age and stature, not only with safety, but often with advantage to the trees, and the marvellous transformation of common-place into rich or glowing landscape. The mechanical difficulties may be said to have positively vanished at the bidding of such men as STEWART, MACNAB, and BARRON, so that the actual transplantation of trees becomes a mere matter of mechanical skill and expense. There is therefore no need in the present day of allowing trees to grow on in the wrong place, when they may safely be removed into the right. The choice now is not between trees that are an eyesore or their destruction, but the practical question is, Shall they continue to disfigure or be made to adorn the landscape? Practically trees up to at least fifty years old are now portable; they may be lifted and conveyed a mile, twenty, or a hundred miles with impunity. Nevertheless it is not wise to trust too much to our mechanical facilities for the transplantation of trees, as it is extremely doubtful whether our forethought in preparation and the wisdom of our after-treatment have kept pace with the improvement in our lifting and transplanting machines. By the aid of the latter landscapes may be made in a day, or at most a week or two, the effect in many instances being marvellous as a fairy tale. These rapid transitions are in harmony with the spirit of the age. Everything must now be done by express. A mile a minute seems slow travelling to some; telegrams threaten to supersede the penny post, and the telephone has been called in to render our intercommunion simultaneous. In harmony with all this there has arisen a cry, especially from our commercial classes, for what may be called instantaneous landscapes. The full furnishing, the rich mellowness of age, must be given in a few months. It can be, has been done to a great extent by the transplantation of large shrubs and trees. The growth of half a century, sometimes far more, have been placed in

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open fields or around raw bricks; shrubs of good stature have been moulded into belts and clumps, green turf has been laid down, and, presto! behold a garden, pleasure-grounds, parks.

But to ensure success in such operations we must not only have powerful machinery and the requisite skill and force to use it, but the plants and the soil should both be carefully prepared, and the former need special care afterwards. Most of the failures that have occurred in this simultaneous mode of forming landscapes have arisen from overlooking these facts rather than from mere faults in the mode or time of transplanting. As to the plants, they should be carefully selected, and the roots and tops pruned a year, two, or even three years before transplantation. As a rule, large trees and shrubs are transplanted because they are too thick. They are severely overcrowded before thinning. This begets abnormal tenderness in the trees, growth is rapid, and the bark thin. The mere removal of such trees into more open and exposed positions, supposing every root was lifted and replanted intact, would prove a severe check to them. But of course some roots will be lost, more probably injured by removal. Thus crippled and placed in a more open and exposed place the trees become checked and stunted to such an extent as frequently never to recover. The mode of removal, the after-treatment, are too often blamed, whereas the fault lay in the tree itself. Its attenuated stems and branches, thin bark and abnormally tender constitution, rendered success impossible. In all attempts at planting in a landscape of considerable extent reject every tree that has been drawn up by overcrowding. Select those that have been grown in the open, and, if possible, on more exposed sites and soils than those in which the tree are to be placed. If such material cannot be found, then it is better not to attempt furnishing with large material, however promising it may be. It will only prove a waste of force and of time, and it is far more satisfactory to plant small trees and watch them growing into beauty than to plant larger ones and be compelled to see them become smaller or more unhealthy day by day. But even with the best material from the best sites the roots should be prepared for planting some time previously. The simplest mode of preparing them is to dig a trench round the trees from 18 inches to 3 feet from their boles according to their size, and a yard or so deep. Let all the roots found be cut clean off with a sharp knife, and fill up the trench with some of the best soil or lightest compost at command. In a year or two this compost will be filled with a network of feeding roots. In transplanting the tree the trench should be dug out, so that its inside shall impinge on the outer extremity of the compost. The root mass will then consist of a solid centre of undisturbed earth, fringed with a rim of roots and compost. If all this is preserved success is well nigh certain. Even should the foreign earth fall off the roots will remain.

As to the depth of the ball, that will depend considerably on the age of the tree, character of the soil, &c. It may seem paradoxical to advise that the younger the tree the deeper the ball should be; but it is of the utmost importance in the removal of youngish trees to preserve the tap-root if possible, though if it cannot be kept intact, the mass of it should be, and the more the better. It is not only the holdfast but the moulder of the form of the tree. Both these facts are far too much overlooked in the transplantation of trees for ornament. Culturists are so much in the habit of waging war against tap-roots to foster fertility, that they are apt to overlook their potent influences on the form and stability of trees. As old trees are already formed, tap-roots are of less moment to them. In fact, age, the sterility of subsoils, and other causes mostly either destroy or modify the tap-roots of aged trees. Having served their purpose they pass away or are lost amid the general character of the other roots. It is far otherwise, however, with younger trees, to which tap-roots are so valuable as to be worth all the extra labour, that their finding, preservation, and careful replanting in vertical positions involves.

But the top should also be prepared as well as the roots. This consists in judicious thinning, foreshortening, and regular balancing. All superfluous weakly wood should be cut out. This reduction of top area is philosophical in theory, and most useful in practice. Transplant as we may, there is of necessity a considerable disturbance and destruction of roots. As the action and reaction of the tops and roots of trees may be said to be reciprocal and equal, it follows that the tops should be reduced in an equal ratio. Nor is this all: a concentration and augmentation of growing force is wanted as much as, or more than its reduction. These latter objects are secured by the foreshortening of vigorous branches as well as the removal of weakly ones. By reducing the length of the boughs, stronger breaks are developed in closer proximity to the trunk or bole of the tree. This is just what is wanted. With a vigorous bole well furnished with strong branches as near to it as possible, the strength of the tree is brought within narrower limits and into more manageable compass. The tree is thus enabled to husband its resources and reserve its force, a maximum of energy is stored up in a minimum of area—points of the utmost moment to the future vigour and perfect form of the tree.

These new and stronger growths above have also their counterparts in similar growths below, and in this way the added soil or compost becomes a matted mass of strong and healthy roots.

The regulation and careful balancing of the top of the tree about to be transplanted is more for its future benefit than its advantage now; but, of course, in so far as these reduce its area and concentrate its vital force, they are useful as other prunings. But the exact balancing of the top boughs, as well as the reduction of the top, alike help the tree to stand firm in its new quarters with little or no support—points of the utmost importance to its future well-doing. It is hardly too much to add that hundreds of trees that have been transplanted with considerable expense have been pulled out of form, or right over, in spite of expensive staking, through the persistent operation of lop-sided tops that a quick eye and a sharp knife might have pruned into self-sustaining vertical stability in a few minutes.—*Gardeners' Chronicle.*

Editorial Notes.

ALL vegetables, when cut, may be kept fresh by putting the stalks into water. Servants generally insist on immersing them, which favours decomposition. Parsley, in particular, can seldom be guarded from a watery grave. Carrots, turnips, and the like, if placed in layers in a box of sand, will keep for many weeks.

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ARTIFICIAL MANURES.—Notwithstanding the analyses of chemists, in regard to the perfection of chemical manures, and the fact which they so easily demonstrate that the greater part of stable manure is nothing but water and other materials of no possible value and costing immense labor to handle, it is remarkable that the demand for stable manure is greater than ever. People find it best in spite of chemistry.—*Gardeners Monthly.*

MAHWA FLOWERS.—According to the *Gardeners' Chronicle* the export trade in Mahwa or Mowha (Bassia latifolia) flowers to Europe for distillation, which attained such large proportions a few years ago, seems to have suddenly ceased. In 1884, 269,329 cwt. valued at £67,066 were shipped from India: in 1885, 30,372 cwt. valued at £6,091 were shipped; now the export has stopped. These flowers constitute an important article of food among the natives in the Central Provinces.

A GIGANTIC SEA-WEED.—Captain John Stone, commander of the ship *Clever*, recently carried to Montevideo some remains of a gigantic sea-weed that he picked up near the equator. While overtaken by a dead calm in these regions, the sailors perceived an object floating on the surface at some distance from the ship. manning a boat, they rowed out to it, and found to their surprise that it was alga of the extraordinary length of over 1500 feet. From an examination of the specimens collected, botanists identified the plant as *Macrocystis pyrifera.—Scientific American.*

VOELCKER, in the Journal of the Royal Agricultural Society, gives some results of experiments with various manures on pasture land. Common salt had an injurious effect; crude potash salts were of no value; quicklime and bone were generally beneficial; nitrogenous manures gave the largest crop; superphosphate with crude potash salts gave excellent results. A moderately concentrated solution of caustic soda or potash promotes the germinating power of seeds to an extraordinary degree.

FLOWERS AND THE SICK.—It is supposed that many flowers should be carefully kept away from sick people, that they exhaust the air or communicate to it some harmful quality. This may, in a degree, be true of such strong fragrant blossoms as garden lilies, but of the more delicately-scented ones no such effect need be apprehended. A well-aired room will never be made close or unwholesome by a nosegay of roses, mignonette or violets, and the subtle cheer which they bring in with them is infinitely reviving to weary eyes and depressed spirits.

WEARIED PLANTS.—"There go those wretched old plants again" said a young friend of mine the other day as we passed together by a house in which a ball was imminent; "I have seen those Palms everywhere for the last month, and as for that Pitcher-plant, I stuffed a cigarette into one of its jugs at Lady Y—'s and smoked that same at Lady Z—'s." It is certainly disenchanting to suspect that the very flowers in a London ball-room are undergoing a course of dissipation similar to that which fades the cheeks of human "wall-flowers." Roses and Geraniums should, at all events, be fresh, since unsullied bloom is their *raison d'être.* —*Truth.*

FRUIT ORCHARDS AND MARKET GARDENS.—The area of fruit orchards in Great Britain is increasing, there being 197,539 acres in 1885, as against 194,723 acres in 1884. It is worth noticing that there is an increase in all but six counties of England, the exceptions being Cheshire, Gloucestershire, Lincolnshire, Middlesex, Northamptonshire, and Somersetshire, in each of which there is a small decrease. The largest decrease—96 acres—is in Middlesex, where it is no doubt due to the extension of buildings. The area of market gardens is also increasing, there being 59,473 acres in Great Britain in 1885, as compared with 52,975 acres in in 1884. In Wales and Scotland the disposition to grow more fruit and garden-vegetables is less general than in England.

TREE-CLIMBING PLANTS, like the human parasites who hover round successful men, usually excite suspicion and dislike. But there may be uses other than their apparent ones for even such. Professor T. R. Fraser, at the May meeting of the Botanical Society, described the admirable properties in heart disease, of *Strophanthus hispidus*, the source of the arrow poison of the natives of Eastern Africa. Professor Fraser's experiments with this new drug, very many times more powerful than *Digitalis*, or the common foxglove, appear to inaugurate a new era of hope to many new sufferers from a class of diseases apparently increasing with the march of modern progress. He gave great credit to Mr. John Buchanan, of Zomba, Eastern Africa, for his exertions in furnishing the necessary material.—*Journal of Forestry.*

WHEAT FOR FORTY-ONE YEARS WITHOUT MANURE.—Probably no other cultivated plot of ground is so widely known as a small wheat field, at Rothamsted, Eng., which has been cultivated for forty-one years without manure, it having been cropped continually with wheat. This plot has been used these many years in the important experiments of Messrs. Lawes and Gilberts, with the effect of different fertilizers upon wheat, as a standard with which to compare the results from other plots. Aside from the important part played by this field in the series of experiments so long continued, it is of great interest as showing what inexhaustible stores of plant food the soil contains. This unmanured field, the past season, a bad one for wheat, yielded thirteen bushels of wheat to the acre. The average yield for forty-one years (1852-83), was thirteen and one-eighth bushels per acre. This is about equal to the average yield of the state of Ohio, at one time celebrated as a wheat producing region.—*American Agriculturist.*

THE COMPASS PLANT.—It has long been known that the western plant growing on the open prairies of America, and known as the Silphium laciniatum, has the property of turning many of its leaves nearly north and south, and hence the name "compass plant." It is also called "rosin-weed," from its copious resinous juice. In order to determine to what extent this alleged polarity exists, Mr. C. E. Bessey, of Ames, Iowa, has, say the *Scientific American*, made a large number of accurate observations, which he reports in a late number of the *American Naturlist* Out of ninety-three observations, fifty-four were found which pointed more or less east or north, and thirty-nine more or less west. Of the thirty-four which pointed eastwardly, eighteen were within 5° of north, eight more within 10°, seven more within 15°, five more within 20°, and three more within 25°, leaving only fourteen leaves which diverged more than 25° from due north. Of the thirty-nine which pointed to the west of north, nine were within 5°, five more within 10°, three more within 15°, 7 more within 25°, and seven more within 35°, leaving only eight which diverged more than 35°, from due north. Its polarity is, therefore, fully established.

GARDENING AS AN INDUSTRY.—It is strange that fruit and vegetable gardening should not receive among us that attention as an industry which it deserves. We pay £6,000,000 sterling every year for imported fruits alone. France, Jersey, Holland, Spain and Portugal send us Grapes, Melons, and Figs; we receive enormous quantities of Apples from France and America, and Pears from Frace and the Channel islands. So satisfactory to fruit growers are the price now realised in our markets, that news reaches us from the continent of fruit culture being rapidly extended in many districts. For some kinds of fruit our growers have but a poor chance in competing with their continental rivals, but for others the British grower has many advantages, and might develop a very profitable industry. We import, for example Apples and other hardy fruits at a yearly cost of nearly £2,000,000, and all the time we have thousands of acres of cultivated land devoted

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to a far less remunerative purpose—timber growing—besides thousands of acres lying waste. As it is, the demand for fruit and vegetables exceeds the supply, and this demand, it is worth observing, arises in a great measure from a growing taste for these articles of food among the more intelligent of our labouring population, who, after all, influence the sale of food commodities far more than the wealthier classes.—*F. W. B. in "The Garden."*

PLANTS GROWN FOR THEIR PERFUMES.—We admire flowers quite as much for their fragrance as for their elegance of form and beauty of color. This is shown by the fact that almost every one on seeing a strange flower almost involuntarily brings it near that organ through the aid of which we enjoy odours. There are great differences in the characters, so to speak, of the perfumes of flowers. The delicate refined odour of European Violets belongs to so modest a flower, while the overpowering, almost intoxicating perfume of the Gold-banded Lily (Lilium auratum) suggests heated ball-rooms, a crowd and display. There is one shrub which is not showy, but its tiny white flowers have such a choice odour that, were it better known, it would be often met with in the greenhouse and window garden. This shrub is generally known as *Olea fragrans*, the Fragrant Olive, but it is not an olive, and its proper botanical name is *Osmanthus fragrans*. It is a much branched evergreen shrub, producing an abundance of tiny white flowers, scarcely half an inch across, and is almost constantly in bloom. It is difficult to describe odours; perhaps that of this flower may be best described as "satisfying." Some would call it "exquisite," and others might exclaim "how *recherché*" without knowing exactly what it meant. It is said that the Chinese add this flower to their choicest teas, in order to perfume and flavor them. If this is true, the Chinese shew a discriminating taste in selecting perfumes—*American Agriculturist.*

ROOT HAIRS.—That the largest portion of the liquid used by the growing plant makes its entrance through the roots, from the soil, is a well-established fact; but those parts which are the most active in the absorption of this food material in solution were for a long time not so clearly understood. By careful experiments and microscopic investigation it is found that the extreme tips of young roots are about the only portion which take little or no part in this work. A short distance back from the growing points, on nearly all growing roots, may be seen with the aid of a microscope a large number of minute, slender bodies extending out in all directions from the surface of the root. These thread-like structures are not inaptly called root hairs, and consist of sac-like protuberances, as outgrowths from the epidermis or surface cells of the root. With the naked eye they are not easily seen, but their presence may be inferred from the manner in which they cling to the particles of the soil when a young root is lifted carefully from the earth in which it was growing. This power which they have of fixing themselves to the grains of earth is very great; so that when a plant is taken violently from the soil, large portions of these delicate hairs are broken from the roots and retain their attachment to the soil. As the root grows along in the earth new hairs are produced, while those behind perish as the root becomes woody, and a dense, non-absorbing, protecting epidermis is formed; so that the active life of a single hair is of short duration. The office of these hairs must have already suggested itself to the reader. By means of these prolongations the greater part of the absorption takes place, though the newly-formed surface cells are also active.—*B. C. Halstead, in "Gardeners' Monthly."*

PLANT CULTIVATION.—In no other profession than that of gardening is the point of excellence attainable by so many varied roads. Who has ever heard of two gardeners treating their subjects precisely alike? And yet, in walking through an exhibition tent, it is marvellous to behold the similarity of plants that have been subjected to the most widely different treatment. Of course, it does not follow that the results brought about by attention and industry will be rivalled by the result of inattention and carelessness, if ever such cases occur. In perusing the different gardening papers, the same circumstance is prominently noticeable. One asserts, for instance, that if Adiantums are to be grown with success, you must use nothing but pure peat; while another, with laudable purpose, says that anything but pure loam will have the most detrimental and ruinous consequences. Indeed, though interesting it is often amusing, sometimes even laughable, to read these little differences of opinion and experience; and to those who are not thoroughly initiated they are often inexplicable. "Necessity is the mother of invention." And so it often happens that gardeners have to do with, not what they desire, but what they can get. As regards soil, the fundamental principles should always be understood. Plants will live and thrive so long as the chemical constituents necessary to their construction and progress are supplied; it does not matter whether they are given to the plants in the form of peat, loam, or sand; the essentials must be there or the plant will die. There are also atmospherical conditions on which the life of a plant as much depends as on those which regulate the application of soil. To all plant cultivators these conditions are more or less widely known, and it is only by careful personal experience and observation that we are enabled to arrive at any fixed conclusion regarding the atmospherical requirements of a plant. Were gardeners of a warlike disposition, there would often be more than discussional battles over these and similar matters. But it is not so. They always accept the experience of their friends with the utmost thankfulness, and generously impart any result of abnormal treatment.—*M. Barker, in "Gardening World."*

Original Articles.

BULB GARDENING IN INDIA.

LILIUMS OR LILIES.

Descriptive list of varieties—(continued from page 258.)

TURK'S CAP LILIES.

Martagon Group.

This is one of the most richly coloured and beautiful of all groups of Lilies. The flowers are so much turned back as to resemble a turban, hence the common name of Turk's Caps. The whole of this species are distinctly recurved, though some are more so than others. The original Martagon or Turk's Cap Lily was introduced into English Gardens at a very early period. Gerarde writes of it as common in 1596. Parkinson and Miller also describe several varieties. It is still a most beautiful and popular lily, though it has had to give way of late years to its brighter allies, such as *Lilium monadelphum*, *L. canadensis*, &c. The common Martagon is perhaps the most plentiful of all the European species of Lily. It abounds in France, Spain, and throughout the southern parts of Europe, and a large portion of Asia, as far north as Siberia: throughout this wide geographical range this plant retains very much of the same character. In Japan the common Martagon seems almost superseded by the *L. maculatum* of Japan, a variety not offered under that name by the trade. The Martagon is a small yellow oval bulb; the stem, which is densely clothed with fine greyish hairs, rises to a height of from two to three feet; the leaves arranged in whorls composed of from six to nine leaves each; the flowers, from ten to twenty in number, of a purple colour, are arranged in a racemes about a foot in length. In vigorous specimens the flowers are from 4 in. to 5 in. in breadth and about 3 in. long. There is also a double variety of this Lily which is very striking.

L. Martagon rubrum flore pleno is a rather scarce variety, the colour of which is much deeper than that of the common or double Turk's Cap.

L. Martagon album—Another fine variety, contrasting admirably with the others, and is a remarkably choice and striking lily.

L. Martagon punctatum elegans and *punctatum superbum* are two remarkably high coloured and fine Martagon Lilies that ought to

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find a place in every garden. The best, however, of this section of Lilies is probably.

L. Dalmaticum (Catanii) a splendid dark Lily, perhaps the darkest known, a magnificent species, with flowers almost as large again as the common Martagon.

L. Canadensis.—The Canadian Martagon Lily may be described as one of the most beautiful bulbous plants of the New World. It abounds in Canada and throughout the northern parts of the United States, and has long been known and cultivated in British Gardens. It is said to have been introduced from France into England in 1629, having been brought from Canada by the French colonists. The stem is 1½ ft. to 3 ft. high, leaves in four or five regular whorls from 2 in. to 3 in. apart; number of leaves from six to fifteen; flowers from 4 inches to 6 inches broad and 3 inches deep, much less reflexed than the Martagon, ranging in colour from bright sulphur to pale red, profusely overrun with spots of a dark purplish colour, the entire plant rising to a stature of from 3ft. to 4ft.

There are several varieties of this noble Lily such as—

L. Canadensis flavum, yellow, spotted with crimson.

L. Canadensis rubrum, flowers orange red, profusely spotted with crimson.

L. Canadensis kermesina, rich crimson, very fine.

L. Canadensis rubrum flavum, an intermediate form of great beauty.

In addition to these, Mr. Baker reckons several so-called species as sub-species or varieties of *L. Canadensis.* The first place amongst these must be given to the giant Martagon Lily of California, *L. Humboldti.* This is, without doubt, the very finest and most majestic of all the North American Lilies. Its stem rises to a stature of from 4ft. to 6ft. The leaves are arranged in four or five regular whorls of about twelve leaves each. The number of flowers varies from five to thirty; flowers from three to four inches long, of a bright orange colour, spotted with red dots.

L. Humboldti Bloomerianum (*ocellatum*) is a bronzy crimson variety of the above, of shorter stature.

L. parviflorum (*L. superbum Columbianum*) is a rich orange crimson Lily, densely spotted with purple, of great beauty, found in British Columbia and California. It is of much weaker growth than *Canadense.*

L. superbum again with its many varieties is held to be merely a sub-species or variety of *L. canadense.* It is found in swamps and low-lying ground north of Georgia and through a large portion of the United States. This is an exceedingly fine Lily now becoming rather plentiful in commerce. It is a stronger grower than *L. canadense*, reaching a height of from 4 ft. to 6 ft. It flowers profusely under cultivation, as many as from fifteen to forty being developed on a single stem, forming a broad pyramidal raceme.

The *L. superbum pyramidale* is perhaps the finest of all; a tall branching beauty, reaching to a height of 7 ft.; orange spotted with red.

L. Californicum, golden yellow, rich chocolate spots.

L. Leichtlini, a new light yellow variety, very sweet scented.

L. callosum is the Jama-jura, or mountain Lily of Japan, where it grows plentifully at a height of from 500 ft. to 2000 ft. above the sea. The bulbs of this Lily as well as those of *L. tigrinum*, are eaten by the natives. It is rather doubtful whether this L. callosum of commerce is really that species; or *L. tennifolium*, another dwarf and slender scarlet Lily of great beauty, *L. Pomponium* is a native of the Pyrenees, Japan and China, introduced into England in 1629. It is one of the most popular and best known of all Lilies, as it has been long in cultivation, and is generally highly prized for its brilliancy and beauty. It is nearly related in character and general appearance to that most fiery of all the scarlet turn-caps lilies, *Chalcedonicum.* It is found plentifully in a wild state in Provence, Savoy, Lombardy and other countries. The stems are from 18 in. to 3 ft. high; the leaves scattered and very numerous; the flowers are few in a wild state, but mount up to 15 or 20 under good cultivation. The colour is light red tinged with orange, approaching to crimson. There are several varieties of this popular and useful Lily, the best of which are perhaps *L. pomponium rubrum*, rich red and yellow, *L. pomponium aureum*, a beautiful recurved golden coloured variety.

L. Chalcedonicum, the Greek scarlet turn-cap Lily, has been cultivated in England since the middle of the 16th century, and is so well known and generally prized as to need little description. There is a large variety *L. chalcedonicum major* which is even more beautiful. These two are amongst the most striking plants in cultivation.

L. pyrenaicum is a fine, showy, fiery red species, found in the Pyrenees, closely resembling *L. chalcedonicum.* There is also a yellow variety of this species, *L. flavum*, with yellow flowers.

L. testaceum exelsum is one of the most distinct and peculiar of the Martagon group. The stem is slender, and reaches a height of from 4 feet to 6 feet; leaves scattered, though rather crowded together, numbering from fifty to a hundred on the stem at flowering time; flowers from one to six on long stalks, perianth about three inches deep. The colour is a soft apricot or canary yellow. The flowers are also very fragrant. Considerable mystery hangs over the origin of this species; it is thought to be either a native of Japan, or a garden hybrid, and if the latter, a cross between *L. candidum* and *L. pyrenaicum.*

L. carniolicum (the two-dollar lily) has long been comparatively neglected by cultivators. It is a native of the Levant, Austria and Lombardy. The bulb is oval in shape, with lanceolate scales an inch deep. The short stem rises from 2ft. to 3ft. in height. The flowers are not very numerous, but are brilliant and showy, about 2 in. deep, bright orange-scarlet spotted with black.

L. monadelphum (Loddigesianum) is a native of Asia Minor, and is strikingly beautiful and distinct. The stout stems are from 3ft. to 5ft. in height, glaucous; the leaves are scattered, from thirty to fifty on a stem; the flowers number from five to twenty and the perianth is from 2in. to 4 inches wide and deep.

L. pardalinum is one of the most magnificent of all the bog or swamp Lilies of California. It is an annual or triennial variety with small rhizomatous scaly bulbs, the old ones perishing when the young ones are produced; stems 4ft. or 5ft. high, smooth and green. The leaves are arranged in whorls of nine or twelve each near the middle of the stems, there being but few and widely scattered on the upper portions. Flowers from three to six and arranged in a sort of nimbus, the flowers themselves are about 3in. long, a brilliant red colour, orange at the base. There are several beautiful varieties of this magnificent Lily.

L. pardalinum Californicum is still a scarce but very brilliant Lily, of intense flaming scarlet colour, shading to gold; spotted brownish crimson. It is smaller in leaf and also shorter in stature (about 4ft.) than the species.

L. pardalinum Bourgæ is the best of this section, the flowers being larger and, if possible, more brilliant. Though a new Lily, recently introduced from the banks of Lake Winnipeg, it is comparatively moderate in price. It grows from 5 ft. to 6 ft. in height; the leaves narrow, arranged in whorls; flowers of a rich crimson scarlet and yellow colour, enriched with crimson brown spots.

L. pardalinum pallidifolium (*puberulum*) as its name implies is less deeply coloured than the species; it has also fewer and smaller dots.

L. pardalinum Robinsoni is a magnificent variety, growing to a height of six or seven feet, the stems and leaves being of a very massive character; colour of flowers a bright red shading to yellow.

(*To be continued.*)

TROPICAL GARDENING.

Human nature, as a rule, exhibits a craving for things hard to be obtained. Setting the fashion of the period on one side, nothing shows this more plainly than the popular taste or longing for plants which are natives of a different clime to the one in which we reside. In a temperate clime tropical plants are considered essential, while if we are residing in a tropical one then how beautiful to our ideas is the vegetation of the temperate region.

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Residents in Jamaica are no exception to the general rule. The native trees, the almost endless list of herbs and flowers, beautiful in their formation, their variation, their numerous hues and colours, are by the majority of residents totally disregarded, and satisfaction is sought in the introduction of the flora of other countries often no better, seldom as good, as those of the native growth were their beauties fully appreciated.

The attempt to cultivate these introductions often results—as might be expected—in complete failure, seeing that most of them are natives of temperate climes.

The question is often asked here "Why is it I cannot get such a plant to grow?—why do my Dahlias and Gladiolus so rapidly degenerate?"—which, though apparently a very simple question in itself, involves a description of the principles of vegetable physiology, which is generally for the most part quite unintelligible jargon to the querist, and therefore if given falls flat, with the result of leaving the hearer still unconvinced, and with the determination in his mind to "have another try."

Flower gardening in Jamaica, especially among the European residents, consists in the main of a series of attempts at the cultivation of that class of plants usually to be found in the well-kept gardens of residents in the temperate clime. In the mountains, at high altitudes, where the climate is favourable, these trials are attended with a fair proportion of success, but on the plains the same exertions result, as a rule, in disappointment. Some may say "But tropical plants flourish in a temperate climate." So they do, but then the means taken to enable them to do so are adequate to their requirements. There every protection is afforded them; houses are built, a costly system of providing them with the proper temperature is followed; soil is brought (sometimes from hundreds of miles) suitable to their requirements, and the knowledge and experience brought to bear upon the cultivation of plants render it a much easier task to the cultivator there than to the cultivator in Jamaica, where the means of instruction in these matters are not so easily obtained.

Who would think of building a house, to be permanently kept at a much lower temperature than the open air, in the Liguanea plains or other similarly situated place? Yet this is no more absurd than to apply heat for raising the temperature, for it would be done with the same object, viz., that of maintaining a suitable temperature.

It is a well known fact that many plants belonging to the warmer European and Asiatic countries grow well in Jamaica with a little care, and give a fair return for the labour expended on them; but in nearly all of these the close observer will detect a degeneracy, a falling off from the original type, so gradual yet so complete, that in course of time they become changed in such a manner as to be scarcely recognisable.

An incident in the life of the great botanist, Linnæus, plainly indicates that temperature is one of the first points to be studied in connection with the cultivation of plants.

A person had a favourite plant; he supplied it with heat and moisture, and indeed, with everything he considered it to require; the result being that it grew "small by degrees, and beautifully less." Linnæus, then a young man, but a student, requested that he might be intrusted with its treatment. After attentively studying the plant, he withdrew it from its previous situation and pampered treatment, and placed it in a corner where the cold, the wind, the rain, and the frost of winter, could exert their influence with impunity. He had placed it in its element, in its proper temperature, and under natural conditions, and was rewarded by seeing it grow and flourish.

Such are the lessons to be learned by those who are fond of cultivation; nothing but a watchful eye on every requirement can conduce to success. If we see a plant flourishing, find out its family, and then subject its congeners to the same treatment, in many cases success will ensue.

In Jamaica there exists an enormous amount of material for experiment and improvement; pretty wayside flowers, which, if developed with half the amount of skill expended upon similar things in Europe, would repay the labourer a hundredfold.

It should be remembered, however, that it is no use to attempt to control Nature; that is beyond the art of man; but by a careful study of the various forms she assumes to attain her ends, he may assist her in all her efforts, and thus add much to the beauties of the vegetable kingdom.

It is not to be thought for a moment that the writer deprecates the enjoyment by those who wish to do so of their taste for the growth of plants not indigenous to the country, but he wishes to indicate to them that they cannot reasonably expect "great things" from such cultivation.

The writer's ideal of a tropical garden is that it should consist of a collection of the many handsome native trees, shrubs, Ferns and Palms, and such other things as are indigenous to the climate, or can be obtained from countries enjoying a similar one. By grouping the most striking species in prominent localities, noting their time of flowering, and also the time when their foliage is in its fullest glory, for the sake of giving them proper arrangement; by filling secluded nooks protected from the sun's rays, and where the wind cannot ruffle their delicate textures, with the finer species of Ferns, of which no country, for its size, in the world possesses a greater variety than Jamaica, we should have something upon which the eye could rest with enjoyment at every season, and the garden would never be without some feature of interest to the true lover of Nature.

Have you a dry spot where nothing appears willing to grow? Then assemble together the different species of the Cactus tribe. The succulent Euphorbias, and other allied genera, and what was formerly nothing but "Macca"* will, by its various and curious habit of growth, become of interest to its possessor, and will enlighten the visitor as to the many strange forms of vegetable life to be found in the island.

Old trees which cannot be conveniently removed can, by putting in a plant of Bougainvillea or other climber at their base, be formed in a year or two into a magnificent spectacle.

Growing fences should be planted around the boundaries; bushy trees for wind-breaks, and small flowering plants and shrubs for foregrounds, suitable plants for which can easily be obtained at the local gardens supported by the Government.

An avenue of Palms, a woody retreat surrounded by groves of the orange, the citron, or the jasmine, a corner in which bulbous or other plants of low stature find congenial homes, borders well protected for plants noted for their beautiful leaves and others for their flowers, are things which should be sought for, found, and admired in every tropical garden.—J. H. HART, Jamaica, in *Gardeners' Chronicle*.

THE FERTILIZATION OF ORCHIDS.†

The great Orchid family is computed to contain about 5,000 species, ranged under 334 genera. Many are extremely variable, both in a state of nature and under cultivation, so that the above numbers are altogether arbitrary, as all calculations of this nature must ever be. They are widely distributed throughout all parts of the world, except the Arctic and Antarctic regions, ascending the mountains in the tropics till the higher Alps are reached, where they become comparatively rare. All are perennial herbs, neither attaining a woody character nor relapsing to the condition of annuals, and the habit, life history, and slow rate of growth are strong characteristic features of the whole family.

As far as habit is concerned, a rough division may be made into those that are terrestrial and have creeping stems like the deciduous Cypripediums, the Goodyeras, or a fleshy fibrous rootstock like the Neottia, or a tuberous one like Orchis; and again into those that are epiphytical and cling to trees, rocks, or other objects merely for support in their position, using their fleshy roots as holdfasts. The former generally inhabit extra-tropical or temperate countries and alpine regions, although not strictly confined to them, while the latter are more dominant in tropical regions, though liable to overlap the habitats of the terrestrial genera. Singular as are the above mentioned characters, they are altogether surpassed by the modifications and adaptations exhibited by

* West-Indian term for any thorny plant.

† A paper read by Mr. J. Frazer before the Birkbeck Students' Scientific Association.

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the flowers of Orchids. There must needs be a vast amount of variation to distinguish all these 5,000 distinct species, and numerous instances of extreme specialisation occur. The order itself is unique in the vegetable kingdom, and so disguised are the essential organs of the flower, namely, stamens and pistil, that the homology of parts, with that of other natural orders, is with difficulty recognisable. All these extraordinary changes from the primitive ancestors of the family, have been brought about chiefly through the instrumentality of insects.

Parts of the Flower.

The perianth consists of six pieces, in two series of three each. Usually, all are more or less highly coloured, and serve at once as a protection to the essential organs and as a flag of attraction to insects at a distance. The three outer are generally described as sepals, the two lateral and inner as petals, while the third of this series is known as the labellum. The sepals are frequently narrower or less conspicuous than the petals, but no definite rule can be laid down, not even in the same genus, as they are in many cases similar to the petals in Vanda, Dendrobium, Odontoglossum, Lælia, and Sophronitis. They are, moreover, the most conspicuous feature in Masdevallia, Cirrhopetalum, and some species of Bulbophyllum, where the petals and labellum dwarf into insignificance. The petals attain a maximum development in Cattleya labiata and its allies, such as C. Mossiæ and C. gigas, in Sobralia, and some Cyprepediums, as C. caudata and C. lævigata. They are much smaller than the sepals in Stanhopea, Lycaste, and some species of Cœlogyne, while they often resemble the antennæ of an insect in Ophrys, Restrepia antennifera and others. The labellum is usually or nearly always the most highly differentiated of the floral envelopes, and frequently serves a manifold purpose, the most important of which is that of a landing-stage for insects. In a typical flower it is posterior, but in most instances it is made anterior by one or another arrangement. Darwin and other authors seem to be of opinion that it is always brought about by a twisting of the ovary or its pedicel; but this is altogether unnecessary if a normally erect flower-spike is bent downwards, so as to be pendent or arching. The labellum is then, or appears to be, anterior, and the arrangement is complete if the flowers are directed to the upper side of the flower-stalk, so as to have their faces upward. This is precisely what occurs in Angræcum citratum, Odontoglossum crispum, O. Pescatorei, several species of Phalænopsis, and many others. A large number have their long pedicels slightly twisted in arching racemes, so as to make the labellum lateral to the peduncle but anterior to the flower.

The labellum often assumes the most fantastic shapes, resembling birds, beasts, insects, or even human beings, and the likeness is generally greatly augmented by the other floral envelopes. These resemblances are borne out in Peristeria elata, Palumbina candida, Cycnoches, Gongora buffonia, Ophrys, and Aceras anthropophera. No less than thirteen or fourteen species of Ophrys are named as resembling some animal. The labellum, furthermore, is, in the majority of species, the largest and most conspicuous part of the flower; but in Masdevallia, Disa, Cirrhopetalum, and others it is subordinate in size to the sepals.

In the pristine condition of Orchids we have good reasons to believe that there were six stamens and three styles, which are now amalgamated into one piece, the column bearing normally only one fertile anther, belonging to an outer series of three, in all Orchids, except a small tribe, the Cypripediæ, where there are two fertile anthers belonging to an inner series of three. The three stigmas we should expect to find, are visibly present in the Cypripediums, but confluent in one, while in all other Orchids, two are invariably present and distinct or confluent in one. The third is modified into a rostellum, concerned only in securing the transportal of the pollinia or pollen masses from one flower to the stigmas or the stigmatic disks of another. The stigmatic disk is hollow and viscid to retain the pollinia except in the Cypripedeæ where it is convex and entirely without viscid matter, except, perhaps, in Cypripedium acaule. The complex arrangement of contrivances for effecting the sure and safe transportal of the pollinia will be best understood by reference to a few examples from each of the five tribes into which Orchids are divided. These great primary divisions depend chiefly on the structure of the pollinia and their appendages.

Epidendreæ.

The pollinia here are either free or united by short candicles. Dendrobium is typical of the first state and has generally four waxy pollen masses, in two closely applied parallel pairs. The labellum of Dendrobium nobile, Falconeri, Aureum, Pierardi, infundibulum, and numerous others, is curved round the column so as to form a tube for the reception of correspondingly large insects, which when retreating, push off the anther-cap and at the same time have the pollinia glued to their bodies, by means of the viscid matter forming part of the rostellum. The pollinia instantly fall down flat on the insect, a little nearer or towards its head, so that a visit to the next flower brings the pollinia in contact with the viscid stigma, where they are retained. This action is further assisted when the filament of the anther is elastic, as frequently happens, and serves to scoop out the pollinia by reversing the anther-cap.

The other type of this tribe is represented by Cœlogyne cristata, where the four pollen masses cohere in pairs subtended by short appendages or candicles that connect them with the viscid matter of the rostellum. As far as fertilisation is concerned this differs immaterially from the former case. In this particular species the pollinia are much shorter than the rostellum, and cannot be removed by an insect entering the flower. A large insect when retreating would lift up the rostellum, which in its turn would press against the anther, and that meeting with resistance from a broad membraneous hood-like expansion behind it, the pollinia are shot or pushed against the retreating insect, to which they are glued and transferred to the stigma of the next flower visited. The five lacerated lamellæ or coarse fringes along the middle or floor of the labellum offer considerable obstruction to retreating insects, causing them to brush against the rostellum in the manner described.

Vandeæ.

The members of this tribe are characterised by a very high development of parts, and many beautiful and perfect co-adaptations between them and the insects. The pollinia possess candicles, attached to pedicels and those again to a viscid gland resembling or comparable to a foot. The pedicel is an unmodified layer of the rostellum, and the gland also belongs to the same organ. By an extraordinary twisting of the ovary, the labellum in Angræcum eburneum is uppermost, at least, during the period of fertilisation. This is necessary owing to the length and direction of the nectary in order to keep its mouth upwards and prevent loss. The short stout column with its broad bifid rostellum offers the most convenient landing place for insects. The pollinia would attach themselves to the underside of an insect's head, and dangling down, by their own weight would be retained by the viscid disk of the next flower visited, or actually wrenched away from the insect by the clefts of the rostellum.

The process is very different in A. citratum, in which the pollinia possess very long slender pedicels. A smaller insect fertilises this species, and the slightest touch removes the pollinia from the anther, when the elastic pedicels contract or double up instantly in an irregular manner, fixing the pollinia themselves close to the gland on the head of an insect in the immediate vicinity of the stigmatic disk. The labellum forms the landing stage in this species. The pollinia in Phalænopsis, Odonto-

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glossum and Oncidium when attached to the head or proboscis of an insect are brought into the proper position, to fertilise the next flower visited by a hygrometric depression of the lower half of the pedicel, and a curvature of the upper. This takes place with remarkable precision in from thirty to forty seconds. The pollinia after this movement project upwards at an angle calculated to catch the stigma of the next flower visited.

NEOTTIEÆ.

The pollinia in this tribe consist of granular or powdery easily broken masses fastened together by elastic threads attached to the back of the rostellum, part of which in front is modified into a linear gland. The caudicle and pedicle present in the last tribe is here absent. Spiranthes autumnalis, a British species, may serve as a type. The small labellum stands erect against the column forming a narrow tube. Its upper part is recurved and crisp at the margin, affording a foothold to insects, in this case humble bees. These inserting their proboscis in the narrow tube, effect the removal of the pollinia with beautiful regularity, by means of the linear gland on the face of the rostellum. Older flowers only are fit to receive the pollinia, and the bee in visiting the next plant finds it convenient to begin at the lower part of the spike where the flowers are oldest and working upwards.

OPHRYDEÆ.

The greater number of British species belong to this tribe; but all the tribes are represented by British types except the Vandeæ. The pollinia in Ophrydeæ consist of large compound masses made up in coarsely granular packets, and held together by elastic threads united to a viscid gland or glands by more or less elongated caudicles. Several species of Orchis, such as O. morio, mascula, latifolia, and maculata, are fertilised in a similar way, and any will serve as a type of the tribe, although it must be understood that none of the above types represent in detail what takes place in other members of the same tribe. They merely represent in general terms the bearing that the different kinds of pollinia have on the process of fertilisation. The glands of the pollinia in Orchis maculata are contained in a pouch shaped rostellum projecting into the orifice of the nectary. The structure of the flowers compel the insects (generally bees) that frequent them to insert their proboscis in a particular way, depressing the pouch when the adhesive glands fix the pollinia to the head of the insects, and insure their removal with remarkable precision. The hygrometric movement of depression noticed in the pedicel of some members of the Vandæ, is here confined to the upper surface of the gland itself, and is completed in the course of half-a minute, bringing it down parallel with its point of attachment, and in a position to strike the stigma of another flower. Lepidoptera fertilise the British species of this tribe with long nectaries.

(To be continued.)

SEASONABLE NOTES.

THE FLOWER GARDEN.

CROTONS.—All the different varieties of Crotons require plenty of light to bring out their beautiful leaf markings that render them so attractive. Light alone can develop these rich colours, and therefore they should be favored in this respect as much as possible. When their natural colours are fully brought out, there is perhaps no more useful or ornamental occupants of our gardens. While, however, giving plants as much light as possible, we should avoid too much direct sunshine at this season when the plants are making their principal growth, as this tends to the production their natural markings; this is more especially the case with those varieties in which the variegation is confined to shades of yellow or cream on a pale green groundwork. For table decoration, small plants of Crotons having single stems well clothed with folinge are as attractive as any that can be used for the purpose, especially such long narrow leaved varieties as C. Warreni, Mrs. Dorman, Youngii, Prince of Wales, and others of that class. Plants about 18 in. to 24 in. high are the best for the purpose. After they attain that height nip out the top, close to the axil of the young leaf, in order that the wounds may heal over and not show. Any buds that start down the stem should be rubbed out as they show themselves, the effect of which will be to force the whole strength of the plant into the limited number of leaves, which will thus be developed to an unusual size, and the plants kept in the same serviceable condition for small vases during several months in succession. The leaves, too, if kept clean and free from spider and other insects, brighten with age, and are thus more effective for decorative purposes.

TRANSPLANTING EVERGREENS AND SHRUBS.—It will now be necessary to push forward the transplanting of these as rapidly as possible. In removing valuable plants, the state of the atmosphere should be watched, and, if possible, dull, damp weather chosen for the operation. This is the more necessary if the plants have to be moved any distance, as a dry state of the atmosphere would cause them to flag, and the tender roots would be liable to injury if allowed to get at all dry. It is of the greatest importance therefore that the plants should not be kept out of the ground longer than is absolutely necessary for their removal from place to place. When there are large numbers to transplant, the men engaged at the work may with advantage be divided into two gangs, the one in digging and preparing the holes, planting, watering, &c., while the others are engaged in lifting and forwarding the plants. In this way the work can be carried on rapidly, and large numbers may soon be disposed of. Before filling in see that the soil is well washed among the roots, and allow all to settle for a night or so before finally filling up with dry soil. This will prevent the moisture from escaping, and keep the roots in a much more favourable condition than if they had been entirely covered in before watering. Indeed, this is a bad practice, as the soil is sure to crack open and let in large volumes of air which soon absorbs all the water that may have been given at the time of planting: to prevent this, and to keep the roots in a generally uniform state, they should receive a good mulching of half rotten litter, lawn mowings, or any other similar material. The importance of this to newly planted trees and shrubs cannot be over-rated, and we would urge on all engaged in planting, not by any means to neglect this very necessary precaution if they are desirous of ensuring success.

CALADIUMS.—Few plants are more effective for the embellishment of dinner-tables and similar purposes than dwarf sturdy Caladiums; and where plants are much in request for that kind of decoration during the summer months, a good selection should be kept in suitable sized pots, available for service at any time. If subjected to plenty of light, their stems and leaves will become much stouter and stronger, with the colours brighter and more fully developed than when shade is employed beyond what is absolutely necessary to keep the foliage from being scorched.

ORCHIDS.—There is no point of more importance in successful Orchid growing than to ensure their freedom from insects, and to cope with these it is necessary to keep a continuous look out. If the whole collection (as was recommended some weeks back) has been carefully gone over so as to exterminate all the adults perceptible, the work will be very much lighter now, but any that have escaped detection, and the hidden larvæ that lie undisturbed beneath the scaly stem coverings of some, or the axils of the leaves of varieties like Vandas, Ærides and Saccolabiums will at this time quickly come to life. With that worst of all pests on Orchids, white scale, the grower should be content with nothing less than extermination, and this can only be effected by diligent and constant examination of infested plants. The crowded condition that Orchid houses generally get into necessitating the plants standing so closely together that they touch each other in all directions make this, and the equally objectionable but less injurious brown scale, more difficult to contend with, as it is only by actual contact that these insects spread from one plant to another, or in the case of a clean plant that stands immediately

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underneath one hung up or otherwise that is affected. To, so far as possible, prevent these insects spreading we have found a considerable saving of labour effected by standing all the infested plants together, and frequently going over them until a complete clearance is made. The white scale is easily seen, but beginners in Orchid culture do not always so readily detect the presence of the brown species on thick leaved plants like Vandas and Ærides, for although it will live and increase apace on these, yet it never attains more than one-tenth the size that it will grow to on thin leaved species like Calanthes, &c., and in this way we have seen the leaves of the former affected so as to seriously injure them before it was noticed. Orchids will not bear washing with any insecticide strong enough to kill the parasites, consequently there is little recourse except brushing and sponging, which if persistently carried out will effect a clearance of the insects; but it is necessary at all times, and especially now when the plants are in full growth, to see that the cuticle of the leaf is not injured by the brush employed being too hard, or using it with too much force. We have frequently seen the pseudo-bulbs turn rotten through the outer skin being injured in removing scale. Of equal importance to the health of the plants is it to see that the leaves and stems are not allowed to have any dirty sediment accumulate upon them. Many fine collections of Orchids are grown in the neighbourhood of towns where the soot-charged atmosphere is such as to render the frequent use of the sponge necessary to keep the pores of the leaves free and open; where this is neglected, especially in the case of Ærides, Saccolabiums and Vandas, the natural formation of which favors its lodging in the base, it accumulates to an extent that clogs up the pores, and causes the foliage to turn yellow and fall off long before its allotted time.

Dendrobiums.—These are now in vigorous growth, and during any intervals of dry weather they must be kept well supplied with water until the pseudo-bulbs are fully developed. Most of them are true epiphytes, having a pendulous habit, and in making their new growth the middle leaves are arranged so as to throw off any water that may fall on them, even the young growth of those varieties that assume a more erect habit when mature exhibit this tendency. As the young growths of most Orchids are tender and impatient of water, it is a bad practice to tie them in an upright position, thereby depriving them of the benefit of their natural habit of growth, and running the risk of losing the heart, in which case the plants would have to start new growth, probably too late to come to maturity. If the plants are doing well and making sturdy growth, they will need little or no support until the pseudo-bulbs have filled out, when, if tall growing varieties, they may be trained into the required form.

Imantophyllum miniatum.—This deserves a place in every collection, its deep green leaves and conspicuous flowers rendering it striking even among the most brilliant of its associates. It requires very little attention as regards treatment; the less indeed it is disturbed at the roots the better. We have plants of it that have not been disturbed for the past five years, and the roots have become so matted that to all appearance they have no feeding material on which to exist except what is given them in the shape of liquid manure, which they receive copiously, and thus treated they have gone on flowering profusely year after year, and as long as they do so we think it best to "let well alone." There are now a vast number of improved varieties of this plant in cultivation; amongst these there is a great difference in the brightness of colour and in the size of the flowers or truss in the various forms, some of which are so superior to the ordinary variety as to make it comparatively scarcely worth growing.

Roses.—Where it is the practice to propagate these by budding the present is the most favorable season, as the bark of *Rose Edouard*, which is generally employed as stock, rises more freely now than at any other period of the year. Cuttings of *Rose Edouard*, China Roses, Devoniensis and many varieties of Tea Roses will now strike freely.

Annuals.—Seedlings of Zinnias, Balsams, Cockscombs, Amaranthus, &c., should now be ready for planting out. They do best on well raised beds at this season, for although they will all thrive in, and in fact require an inordinate amount of moisture, still anything like a stagnant, water-logged soil is fatal to their well-being.

Potting Soil.—Loam, leaf-mould and manures ought to be got under cover and spread out in open sheds, so as to have it in a sufficiently dry state for use as required. The exceptionally wet weather we have had for some time makes it doubly necessary to see to this at once.

Lawns.—Where there is any turf-laying for new lawns or Tennis Courts, no time should be lost in preparing the ground for its reception, for in all cases after it has been levelled it should be allowed to remain before being turfed until it has been well soaked by the rains; this will cause it to settle, and then whatever inequalities exist can be rectified before the turf is laid down; whereas if it be laid before the settling takes place, it will necessitate its being disturbed. The same holds good in preparing similar ground for being sown down with grass seeds. Where turf has to be made good on lawns or verges it should be done at once, so that the grass may root freely before dry weather sets in.

General Work.—Anent the preservation of neatness, mowing is now the principal operation in demand; neglect of it now would cause annoyance for the rest of the season, for the simple reason that the present being the grass growing period it soon gets thick at the bottom, and unless regularly mown, the bottom grasses get smothered and die, leaving a patchy turf throughout the season.

THE VEGETABLE GARDEN.

In the North-West Provinces and Upper Bengal small sowings of the early varieties of Cauliflower may now be made in pots or pans under shelter.

Celery.—The first sowing of Celery should be made at once in boxes in the coolest sheltered position available; the seed will take a long time to germinate at this season, frequently six weeks or more, but will produce stronger and hardier plants than from sowings made later in the season when the seeds germinate quickly.

Asparagus.—Where new beds are required, seed may now be sown thinly in boxes; these will make strong healthy plants for planting out immediately after the rains. We prefer however to wait till September and sow the seed at once in the beds intended for them. By this method the plants experience no check, are consequently more vigorous, and produce an earlier crop than when they are transplanted.

Tomatoes.—Seeds of the small acclimatised variety may now be sown.

THE FRUIT GARDEN.

Continue the various operations recommended in our last issue. On hot sunny days it will be necessary to syringe freely all plants that are being propagated by *gootee*.

LONDON OFFICE

OF

THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

1, Whitefriars Street, London, E. C.

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Correspondence.

TO THE EDITOR "INDIAN GARDENER."

SIR,—I see you refer in your last issue to queer names for plants. Last year I entered a shop in Liverpool, and was surprised to see there a basket of lichees. I asked the girl what she called them. "Light cheese, Sir," was the answer.

P.

ANSWERS TO CORRESPONDENTS.

ENQUIRER.—The continuation of the Descriptive List of Crotons is unavoidably postponed till our next issue.

FUNGUS.—Where good fresh spawn is available, Mushrooms can certainly be grown without employing any fermenting material, but it is doubtful if such a heavy crop could be raised as would be ensured by securing a gentle bottom heat. How to grow Mushrooms in beds of ordinary soil is fully described in Robinson's "Mushroom Culture."

POSITIVE.—You lose sight of the fact that the term *Indian* applies to other parts of the world besides this great empire. Maize, or Indian Corn, is undoubtedly of American origin, and was not brought to Europe till the year 1500. For the history of this plant see DeCandolle's *Origin of Cultivated Plants*.

B. H.—We would suggest your applying to some of our local Nurserymen. We trust however they will not be overwhelmed with the munificence of your offer. Five per cent commission, provided they guarantee the safe delivery of every plant, and give you the advantage of any trade and cash discounts, although you are prepared to pay only on delivery of goods, is altogether too liberal. Why not stipulate that this should also include cost of Wardian cases, freight and shipping charges, and of course—loss by exchange.

NOTICE TO CORRESPONDENCE.

All matter intended for publication, and all questions to be replied to should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

THE HOME OF THE DAFFODIL.

Innocent and sentimental people might think that the home of the daffodil is to be found where Spenser places it, "on the watery shore," where

Narcissus on the grassy verdure lies;

or where Keats spied them, when

In some delicious ramble he had found
A little space with boughs all woven round;

or where Wordsworth wandered lonely as a cloud,

When all at once he saw a crowd,
A host of golden daffodils,
Beside the lake beneath the trees,
Fluttering and dancing in the breeze.

The real home of the daffodil is in none of these fabled spots; it is in a field near Tooting, fifteen minutes' walk from Earlsfield station, on the South Western Railway. Some centuries ago, more was known about daffodils in Holland than in England, and the old herbalists of Queen Elizabeth's time constantly refer to the "Pyrenean mountains" as the region from which the greatest number of varieties of the "Spanish trumpet," as Evelyn calls them, had been obtained. At the present time, it is notorious that in no part of the world is to be found so vast a collection of the many varieties of the narcissus tribe as in a commonplace two acre field, near Tooting, whose "flowering squares" are now waving with every shade of yellow and white, from the giant Princeps to the slender and delicate Triandrus, a plant which, from its likeness to the snowdrop, is sometimes called the snowdrop narcissus, and to which the Portuguese have, in their language, given the pretty name of the "tears of the angels." It is not generally known that the daffodil is one of the most ancient of English flowers. None have been introduced from America, Australia, or remote China or Japan. So early as 1629 John Parkinson, apothecary of King James, in his work on the "Garden of Pleasant Flowers," gives long lists of the then known varieties of this plant, sixty or seventy in number, which he recommends in the most affectionate language to the gardeners, and especially to the gentlewomen of England. At this period there was a burst of enthusiasm for the daffodil tribe. It subsided, however, in due course; and if we except the fact that a double daffodil, of a pale and somewhat formal type, was named after Queen Anne, there was little sign of any interest in narcissi until the beginning of the present century. From 1800 to 1830 the daffodils had another innings, under the auspices of three celebrated botanists—Herbert, Haworth, and Salisbury. After this date the flower fell out of fashion again. Such varieties as were mentioned in catalogues got inextricably mixed up, and it was not until twenty years ago that Mr. Barr, whose famous collection at Tooting we are now visiting, began to classify and re-arrange them. First, he collected all attainable wild varieties from the various countries where they grow—Spain, France, Italy, and Great Britain; then in 1874, he got together a syndicate who bought up a collection of seedlings which had been made by Mr. Leeds, of Manchester; next, he acquired the Backhouse collection from Darlington. He was considered, as he proudly tells you, daffodil mad. When he persistently went on exhibiting his unpopular goods at the flower shows, the scoffers christened him "Yellow" and other dreadful names. He persevered, however, until yellow flowers became popular and when under the high priesthood of Mr. Oscar Wilde, they became the rage, Mr. Barr at length had his reward, and the daffodil became the prized and popular plant which it is at the present moment. Witness the "Daffodil Conference" sitting this month, one of whose committees is especially devoted to the difficult question of naming varieties between which the uninitiated can scarcely detect any difference at all. It is whispered that in the excitement caused by rival claims, strong passions are sometime excited and strong language used. A somewhat romantic episode has been revealed this year in connection with the subject. In an old herbal written about 260 years ago, a daffodil is mentioned under the name of Narcissus cyclaminius, which is said to have been obtained from the peninsula. A picture of the flower is given, and till this year nothing else remained to show that the plant had existed in England. It had died out and disappeared. This year, however, the lost daffodil was re-discovered in North Portugal, the flower being found exactly to correspond with that figured by the Jacobean botanist, and there is every probability that the re-introduced species will after its long banishment once more appear in English catalogues.

The votaries of the daffodil are probably more numerous than those of any other flower, and this for several reasons. First, it can be cultivated in a very small space of ground—Mr. Waterer requires three or four hundred acres to display his rhododendrons at Woking, while Mr. Barr's collection of daffodils, numerically more extensive, is easily contained in two acres—and there is no garden too small, and, we may add, no purse too slender, for the acquisition and cultivation of these beautiful flowers. Secondly, with few unimportant exceptions, they require no glass or artificial heat, and they can be grown in window frames or even in glasses like hyacinths. Thirdly, they are invaluable for decorative purposes when cut, they travel safely as buds, and come out in water even better than on their original plants. Finally, English literature abounds with references to the daffodil tribe, and there is scarcely a single British poet who does not mention them under the various names of daffadowndillies, chalice flowers, Lent lilies, jonquils, or narcissi. Notwithstanding the hideous surroundings of the place, a half built up suburb of the most unlovely description, there are few spots near

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London which for the next fortnight will be better worthy of a visit than the flat deep-soiled field which, more than any other place in the world, deserves the appellation of the home of the daffodil.—*Pall Mall Gazette.*

THE USE OF LIME.

It is a sort of axiom among farmers that "where lime is used the land and the farmers are rich." This is an old but true adage, and deserves to be made one of the established axioms of agriculture. It is true in two ways—one, that lime is an exceedingly valuable fertilising agent of itself, and in addition exerts a most beneficial influence upon the soil as a solvent of the silicates, chiefly of potash, and also in decomposing organic matter in the soil and favoring its nitrification and the production of the indispensable nitrates which so greatly enrich the soil, the other that its use is one of those higher attributes of skilful farming which is consistent only with the best culture of the soil and the most thorough and systematic working of it. It is, in fact, in the farmer's hands, one of those instruments which is rarely or never found excepting where every part of the farm work is done in the most excellent manner, so that it is not so much that the farmer uses lime as that he uses it as a part of a system of farming which is thoroughly excellent, and, of course, very profitable. Lime is thus not to be used in a haphazard way, and simply to extract from the soil the last vestiges of fertility it can bring out. When thus used another common adage, that "lime enriches the father and impoverishes the son," will surely be found true, because it is like a last turn of the screw which squeezes the last drop of juice from the cider mill. The place of lime in good farming is its application to the land at the Fall season when rye or wheat is sown and grass and clover seeding follows. The land has then become more or less supplied with organic matter from the roots and waste of previous crops, and it has accumulated a store of nitrogenous and carbonaceous matter which cannot be made available until it is decomposed nor until a sufficient quantity of mineral matter has been set free in the soil to balance the supply of plant food required for a new rotation of crops. Besides, at this season and with Fall grain the regular manuring of the land is given, and the manure is generally coarse and undecomposed. It is precisely under such conditions that lime is of the greatest use and value and fits the soil for a new round of crops. The quantity of lime usually applied is 40 to 50 bushels per acre freshly burned or stone lime. In the air-slacking by which it is prepared for use it swells to three times its original bulk and becomes a fine powder which is spread from a wagon, with a long handled shovel, evenly over the soil. This should be done upon the ploughed land immediately before sowing, when it is harrowed in previously. As lime is quite soluble in this fine condition, requiring only 700 times its own bulk of water to dissolve it, it should never be ploughed in, or it will be very quickly carried down into the soil below the reach of the roots of any plants, excepting those of clover. Clover is one of the plants which are wonderfully benefited by lime, and it is for this reason among many others, that its use is to be encouraged, because it provides the skilful farmer with one of the most valuable sources of manure, viz., a heavy clover sod to be ploughed in.—*New York Times,*

THE INSECT CONSUMERS OF CORN.

If we may rely on the Reports of the Agricultural Department of the Privy Council, the English farmer enjoys remarkable immunity from the attacks of that order of insects which in other parts of the world sometimes makes a clean sweep of the crops. Of the nineteen species of articulate animals described by Mr. Whitehead, only one belongs to the order of Orthoptera which contains the voracious family of the locusts. This is the mole cricket, one of the largest of British insects but not yet very common in this country. It is a creature of which the forelegs closely resemble those of the mole. In the early part of June the female lays from two hundred to three hundred yellowish eggs which produce larvæ resembling black ants. These creatures at once attack the roots of the grasses, corn, etc., nor do they change their diet during their rapid growth and successive metamorphoses till they attain the form of the perfect insect, rather more than two inches long, and furnished with with wings. They prefer sandy and peaty soils, and their presence is indicated by patches of dead herbage of which the roots have been bitten through and through by the mole cricket.

Orthoptera abound on the broad unsheltered plains of Southern Europe. Over the grass fields of Apulia and Campania it is impossible in the summer to walk without raising at each footstep a perfect cloud of red, purple, and blue, flashing from the wings of countless insects of this order. The true locust is found in Italy, but only as a visitor. This creature is about two inches long, of a dark-brown colour, and appears in Africa and Southern Asia at times in clouds that obscure the sun. In place of this well-known destroyer, we find in our English lawns and meadows the chirping green grasshopper which, in its perfect state at all events, is carnivorous. It may often be seen on the edge of an anthill devouring some unlucky ant. The insect-eating insects are among the most valuable allies of the farmer, little as he ordinarily regards them.

The hymenopterous or membrane-winged order of insects are but imperfectly represented in Mr. Whitehead's report by the corn saw-fly (*Cephus pygmæus*). Many species of Hymenoptera are destructive to corn, grasses, turnips, fruit-trees and forest trees. These insects, which undergo either partial or complete metamorphosis, are known by their transparent wings (which are crossed on the body when closed) and by the wonderful machinery of their ovipositors; which implements at times take the form of a powerful weapon of offence and defence, sharp and piercing, and provided with a store of venom that aggravates the pain of the wound. With the large hornets the sting has been said to be occasionally fatal to man.

The hymenopterous insects show very great diversity of habit, etc. The wasp, closely as it resembles the honey-bee, is hungrily carnivorous. It may be seen to cut from a sirloin of beef in the dining-table a portion as large as its own head in an incredibly short time, and to fly away with and devour it. It may also be seen to prey upon insects. There is a large black saw-fly, common in Portugal and in Italy, about the size of a small hornet, which bores a little tunnel in the props of the vine or other convenient pieces of dry wood, in which to deposit its eggs. When this creature is at work, the shavings or borings which it cuts to form the hole it is sinking are turned out with marvellous rapidity. The eggs are separated from each other by a diaphragm constructed by the mother-insect; and the larva of some other species is said to be shut in with each egg, to provide food for the saw-fly grub when hatched.

The larva of the corn saw-fly (the *Cephus pygmæus*) lives within the stems of corn. At times it has seriously damaged the rye crop. In 1883 and 1884 it damaged from 20 to 30 per cent of the wheat-plants in different parts of Gloucestershire, Cheshire, and Worcestershire. The insect looks like a small black wasp, with yellow or brownish legs, according to its sex. It is provided with a double set of saws, with which it slits the stems of the corn-plant, not far from the ear, in order to deposit its eggs. In ten days they are hatched, producing a cream coloured caterpillar that eats its way downwards through the joints of the culm till it reaches the root, where it spins a fine web and turns into a chrysalis. It is a comfort to learn that the saw-fly is frequently accompanied by a natural enemy in the form of an ichneumon fly, of about the same size and dark colour, which lays its eggs in the larval of the *Cephus*, which the grub of the invader devours at leisure

The aphides belong to the order Hemiptera; although their remarkable modes of propagation are such as to form them almost into a distinct order. Hardly any kind of plant escapes the ravages of some kind of aphis. The Coleoptera, or beetle order, furnishes a very numerous group of assailants of the wheat plants as well as of the stored grain. Chief among these are the wireworm, the cockchafer, the small chafer, the corn weevil, and the corn-beetle. The cockchafer is destructive both as larva and as perfect insect. The small chafer, though ranked as a different genus from the May-bug, differs little from it in appearance, except as to size. The weevils are beetles with prolonged snouts, like the trunk of an elephant. The female lays her eggs in the grains of corns, especially when in store; and the small larvæ devour the contents of the grain. The corn-beetle, which is as different in form from the weevil as the rhinoceros is from the elephant, resembles the former in its destructive habits. Constant attention to the turning over and the ventilation of stored corn is requisite as a protection against the weevil and the beetle.

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Of flies proper, or two-winged insects; six species are mentioned by Mr. Whitehead. These are the crane-fly or Daddy Longlegs (before described) the wheat-midge, the barley-midge, the robbin-footed cornfly, the lined cornfly, and the frit-fly, which has earned the specific name of *Vastator*. These creatures deposit their eggs in different parts of the growing corn plant, and the larvæ consume the vital juices of stem, blade, and ear.

Even the summer sporting order of Lepidoptera furnishes enemies to the corn crops, in the shape of the antler-moth and the corn wolf-moth. The caterpillar of the former eats the young shoots and the roots of the corn-plant; that of the latter attacks the grain in store. To these insects proper, varying as they do in the time and the mode of their attacks on the crops, are added species of millipedes, of thysanuræ or springtails, and of vibriones or threadworms. The earwig is one of the best allies of the farmer against the corn-thrip or springtail which preys on the ears of corn when just opening into blossom.

If we may trust the authority we have cited, these insects are largely on the increase in Britain; and there is but one substance known to chemistry which is at the same time destructive of minute animal life and harmless to vegetation (indeed, helpful to it in some cases), and that neither the ravages of the hop-fly nor those of the phylloxera have yet induced the farmer to employ. Those who suffer from the depredations of insects will do well to provide themselves with the "Manual of Remedies and Means of Prevention for the Attacks of Insects on Fruit Crops, Forest Trees, and Fruit," written by Miss Ormerod; or with the "Reports of Observations of Injurious Insects," of which the ninth has been recently published.—*St James's Gazette.*

COMPOST HEAPS.

What is a compost heap? Properly made, it is a heap of manure, a repository of all kinds of otherwise obnoxious matter, which it converts into harmless and most valuable plant-food. I say properly made, for there are heaps and heaps, and it is rare to find one so built that its contents will decay well, or one not surrounded by valuable liquid which is too often allowed to run to waste. The heap is often thrown up anyhow for its materials to dry instead of rot, and much of its value is lost in that way. To make a proper compost heap there must be a fair proportion of stable manure. Having that at command, first dig out an oblong trench in a convenient situation. It may be eight by twelve feet for a garden, and twice or three times the size for a field. Throw out all the black soil, down to the clay, upon one side, leaving the other clear for wheeling or carting alongside. Commence with a layer of coarse stable dung, about six inches thick, spreading it evenly over the bottom. Then build up, layer by layer, evenly and flat, with the clearings of hedgerows, ditches and grassy walks, weeds of all kinds (unless going to seed, when they should be burnt), lawn mowing, leaves, pea and or bean stalks, etc., in fact, anything which will decay. Always shake out the stable manure and green stuff, to form an even layer, never leaving so much as a barrowful in one spot. Build up the sides as plumb as the walls of a house. Between every three or four layers of manure and green stuff throw a sprinkling of the earth taken out, to prevent heating too much, or a dressing of ashes, if at hand. Deposit here all the kitchen or house waste (old boots or tin cans excepted), and the droppings from the fowl-house. Break up any lumps in the hen manure, or better still, throw dry earth under the roosts. After every layer of stable dung, or green stuff, tread it down well, and so go on, adding layer by layer, but never more than four or five inches of any one kind. Should there be rather more stable dung than other materials, throw over more soil, which will absorb the moisture and assist in the decomposition. Scratch the sides down with a fork, leaving it as neat as a stack, but with a flat top, and when about four feet high, cover all with a layer of three or four inches of soil to keep in the ammonia. After the heap has been allowed to heat for a week or so, throw over it the liquid waste from the house, etc., and if any liquid should run from the heap, dig a hole at the lowest corner to catch it, and throw it back over the top. Of course, if pigs and cows are kept, the mixture will be all the better. In about three or four months, the whole will be found in prime condition for any kind of crop. A heap of this kind should always be under way, in order to dispose of all waste or decaying matter, allowing the garden and surroundings to be kept in much better order. Whenever the heap gets about four feet high, top off with a layer of soil and start another. Method makes money.—*American Agriculturist.*

AMERICAN VEGETABLE SEEDS.

It is a well known fact that many kinds of Vegetables are cultivated in America to a much higher degree of perfection than in any other country in the world, and foremost amongst these must be placed Cabbages and Tomatoes.

By the next mail steamer we shall receive a trial shipment of the following splendid varieties of the above from the celebrated seed grower Mr. J. J. H. Gregory, Marblehead, Massachusetts, and for which we are now registering orders. The descriptions given are those of the raiser.

CABBAGES.

The Stone-mason Cabbage.—This cabbage is distinguished for its reliability for heading, the size, hardiness and quality of the heads. Under proper cultivation nearly every plant on an acre will make a marketable head; the heads vary in weight from nine to over twenty pounds, depending on the soil and cultivation.—Price per pkt. As. 0-8; per oz. Rs. 1-8.

Marblehead Mammoth Cabbage.—This is, without doubt, the largest variety of the Cabbage family in the world, being the result of extreme high culture. I have had heads, when stripped of all waste leaves, that could not be got into a two bushel basket, having a diameter two inches greater! In a former circular I quoted from persons residing in fourteen States and Territories, and also in the Canadas, East and West, expressing their great satisfaction with the Stone-Mason and the Marblehead Mammoth Cabbages, in their great reliability for heading, the size, sweetness and tenderness of the heads. They had succeeded in growing the Mammoth to the weight of thirty and forty pounds, and in some instances upwards of ninety pounds.

In a competition held last season in America, the first prize Cabbage of this variety weighed ninety-two pounds.—Price per pkt. As. 0-8; per oz. Rs. 1-8.

The Warren Cabbage.—A variety of recent introduction; it makes a head deep, round, and very hard, the outer leaves wrapping it over very handsomely. In reliability for heading no Cabbage surpasses it. Under ordinary cultivation the heads average 10 to 12 inches in diameter.

In the competition above referred to, the first prize specimen of this variety weighed seventy-five pounds.—Price per pkt. As. 8; per oz. Rs. 1-8.

TOMATOES.

Tomato, "The Favorite."—This variety possesses several advantages over any other, it is smoother than the "Paragon," and never hollow late in the season. Does not crack after ripening like the "Acme," is of a darker red than the "Perfection," and is larger than either; it has very few seeds, is ripe all through at once, and is very productive.

Price per packet As. 8; per oz. Rs. 2.

Tomato, "Canada Victor."—A symmetrical and handsome variety, in ripening it has no green left round the stem (a great fault with many kinds otherwise good.) It is heavy, full meated and rich, between round and oval in shape, and red in colour; it will be found to excel most varieties in that most desirable characteristic,—in earliness in ripening the great bulk of the crop.—Price per packet As. 8; per oz. Rs. 2.

Yellow Victor.—A beautiful medium-sized bright golden yellow variety, almost perfection in shape, a great improvement on "Greengage and other yellow varieties—Price per packet As. 8; per oz. Rs. 2.

Tomato, New Red Apple.—A new very large, round, solid variety, of brilliant colour and fine quality; one of the largest varieties in cultivation.

Price per packet As. 8; per oz. Rs. 2.

A collection of 1 packet each of the above seven varieties for Rupees Three only, or 1 oz. of each for Rs. 10.

THE CALCUTTA HORTICULTURAL COMPANY,

NURSERYMEN SEEDSMEN AND FLORISTS.

1, 3, 8 & 29 Tiljullah Road, Calcutta.

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Editorial Article.

THE NATURAL DISSEMINATION OF SEEDS.

In the dissemination of seeds we have the law of nature's frugality fully demonstrated. In fact we may term it the great commercial system of nature by which the wheels of vegetation are kept in constant motion, the supply being ever ready to meet the demand. Had this important law been wholly entrusted to man, the tendency of his capricious temperament to favor one species more than another would soon have annihilated whole genera of plants, and the time must necessarily have come when vegetation must have assumed a most destitute appearance.

The natural agencies by which dissemination is produced may be classed under the following order :—

1st.—The self-distributing pericarps.
2nd.—Dissemination by birds and animals.
3rd.—Distribution by wind and water.

1st.—The self-opening power of the pericarp in its simplicity and efficiency of action is truly mechanism of the highest order. We may take the balsam as an example. Let but the slightest pressure be placed upon the ripened seed vessel, and the segments instantly separate, and curling up with much velocity scatter the seeds in all directions. The pericarp of Drosiferous ferns is furnished with an elastic ring which acts with similar force.

Many of the coniferæ tribe come under this class, as for instance the cones of the Pine, when exposed the second year after fructification to a strong sun heat suddenly burst asunder, causing a report that may be distinctly heard at some distance. Many seeds even after their discharge from the pericarp still retain their locomotive power; such is the case with seeds of wild oats; they are furnished with a spiral arm covered with a fine hair, these hairs act as so many fulcra contracting or extending according to the state of the weather. The seed is thus kept in continual motion until it either germinates or is destroyed. Barley possesses the same power. A professor of Botany recommends those who are sceptical respecting this self-movement to introduce an ear of barley at the wrist before taking the morning walk, and by the time he has returned it will have mounted to the arm-pit. (The exact time in which the experiment may be worked is not specified).

2nd.—As these modes of dispersion which we have noted cannot be expected to carry the seed to any distance, we must pass on to the agencies appointed for that purpose. Amongst the foremost of these come the feathered tribe. Their decided preference for the drupe class of fruits, their acuteness and alacrity in selecting and bearing away the finest of the same, are all so

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many stages in the process of dissemination but too well known to the observant eye of the pomologist, who in his haste would term them plunderers of the blackest type unless the spirit of philanthropy caused him to reconsider. For are they not the handmaids of fruitfulness, and is it not right that we be called upon to sacrifice by the law of dissemination for the welfare of posterity? The seed of the Mistletoe and many species of fruits are disseminated by being swallowed along with the pericarp and retained for some time by the digestive organs, maintaining their vitality unimpaired. In fact some seeds refuse to germinate until they have undergone a similar process. The seeds of *Magnolia glauca* afford a good example. Even seeds submitted to boiling water have afterwards germinated. Dr. Hamel gives an account of others that retained perfect vitality after having been placed in a temperature 73° above boiling heat.

The peculiar hook-like termination of some seeds fits them for ready attachment to birds and animals. The industrious habits which some animals and insects possess of laying up stores of food is also favorable to dissemination; for instance, in England and other temperate countries the squirrel lays up a store of acorns; another animal, either from accident or mischief, squanders them. The squirrel gets little good out of them, but in due time they germinate and become the Oaks of the future. If we had the means of tracing the early history of many of the oldest living Oaks, we should find most of them came into existence under somewhat singular circumstances.

3rd.—We now consider the disseminating power of *wind* and *water*. The seeds or spores of Mosses, Lichens and Fungi are subject to the aerial power. The class Syngenesia seem to be specially adapted for this mode of dispersion. The down with which the seeds are furnished wafts them with velocity into space, where they continue to float, until, increasing in gravity, they gradually descend. The seeds of the Elm and the Ash for instance are accommodated with membranous wings, by which they are caught as they fall from the parent tree and are often carried for a considerable distance. It may not be out of place here just to notice with what rapidity newly disturbed ground becomes re-covered with vegetation. Whether it arises from some power of attraction in the soil whereby it draws from floating stores of the atmosphere, or that it vegetates from seed that has long been buried and may accidentally have been brought to the surface, we cannot say. It is however a well known fact that some varieties of seeds retain their vitality for a great number of years if buried a certain depth; we may therefore accept of this as partial evidence. Professor Henslow remarks that in the fens of Cambridgeshire, after draining and ploughing had taken place, large crops of black and white mustard invariably appeared. M. Girardin succeeded in raising Kidney Beans from seed at least 100 years old taken out of the herbarium of Tournefort.

We now finally notice the last of these distributing agencies, *viz.*, that of water. Sometimes seeds only, but more frequently fruits, are transported immense distances by running streams and ocean currents. The fruits of Fennel are exactly like miniature boats, and Funchal, or Fennel Bay, in the island of Madeira, owes its name to this plant colonized there by seeds that have safely made the voyage from the main land. In like manner Hazelnuts, Walnuts, and many other kinds of nuts have been carried to a new home beyond the seas. For a long time the source of the large Cocoa-nuts that drift about in the Indian Ocean, and are finally stranded on the Malabar Coast, remained a mystery. These gigantic fruits, many of them more than eighteen inches in diameter and weighing from forty to fifty pounds, are not the produce of any neighbouring country, and the Hindoos called them "Sea Cocoa," supposing that they were supplied by some unknown marine plant. It has since been discovered that they are the fruits of *Lodoicea Seychellarum*, a magnificent Palm growing in the Seychelles Islands which lie on the eastern coast of Africa, more than twelve hundred miles from the nearest point of Indian territory. The currents of the Pacific Ocean carry out Cocoa-nuts and other fruits from the American continent to enormous distances in a similar manner. It is an historical fact that Columbus became thoroughly convinced of the existence of the New World from the seeds which he found along the coast; his quick observant eye at once detected them as visitants from other shores. The splendid vegetation existing on the isles of the Pacific must have been produced from seeds transmitted in this way. Thus we see how nature can produce the grandest effects without calling in the assistance of man. The coral insect builds an island and the waves furnish it with the most choice productions of the vegetable kingdom.

According to the direction of the winds seeds are continually passing and repassing from shore to shore. Thousands of miles are thus traversed without any injury to the seed, unless it be that they are placed under climatic variations unsuited to their natural constitution. But if all seeds disseminated were placed under favorable circumstances for germination, vegetation would become too rank. The white Poppy, for instance, often contains 5000 or 6000 seeds; the Vanilla from 10,000 to 15,000, while a single plant of Tobacco has been found by calculation to produce the incredible number of 360,000. If therefore a large portion of this annual increase were not destroyed by animals and other causes, we should be inclined to look upon the law and agencies of dissemination as a curse rather than a blessing.

The action of men in the dissemination of seeds is shown in a thousand ways. We will borrow from M. Alphonse de Candolle some interesting remarks on this subject.

"The first colonies which were sprinkled over each continent," says this learned botanist, "probably carried with them several species of useful plants, and especially some of those seeds which get attached to clothes and to domestic animals, and which will grow easily in the neighbourhood of dwellings, near dunghills, burnt ground and rubbish heaps. The scantier the population, and the more foreign it is to the arts of civilization, the more insignificant become their primary seed-carryings. When the population becomes denser and more civilized, when agriculture begins and extends its rule, then the occasions are multiplied for the transport of seeds. A hunting or pastoral people, no doubt, traverse a vast extent of country, but an agricultural people prepare ground fit for the reception of new species, and bring the seeds for their fields from more or less distant countries, introducing with it different plants, many of which naturally grow wild. In short, war has created vast empires, and compelled men to make numerous journeys; navigation has extended itself, new countries have been brought into communication with the old, agriculture has exported its

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products and horticulture has stocked our gardens with thousands of foreign species. By all these means the transport of seeds has become increasingly great, and an influence has been exercised quite preponderating over natural causes.

Editorial Notes.

To keep seeds from the depredations of mice, mix some pieces of camphor with them. Camphor placed in boxes or drawers will prevent mice from doing them injury.

For garden walks were gravel gets green and unsightly, a thin coat of ashes will provide a pleasant means of getting amongst one's floral treasures when wet slippery soil would destroy all chance of doing so for at least one fourth of the year.

Asparagus Culture in France.—As an illustration of the extent to which Asparagus is planted in France, we may say that one grower alone, M. Godefroy Lebeuf, of Argenteuil, disposed of four hundred and thirty-six thousand plants during the last planting season.

In summer and in warm weather compact soils are, according to Professor E. Wollny, on the average warmer than loose soils; but in winter, and on a fall of temperature in summer, they are colder. In warm weather compact soils are warmer by day and colder by night than loose ones, and are subject to greater fluctuations of temperature.

A Trial with Chrysanthemums.—In the report of an exhibition held by the Stoke Newington Chrysanthemum Society, we read that several dwarf plants, produced in the following manner, were much admired. The stems, in August or September, were surrounded by pots of soil at a foot or more below the top, after the manner in which trees are layered. A pot has a slit cut in its side to admit the stem, or it may be sawed in halves, the stem passed through the hole in the bottom, and the parts wired together. The pot is filled with soil which is to be watered as needed. By the time the flowers are in bloom, there will be a sufficient number of roots struck into the soil to sustain the top, which may be separated from the plant by severing the stem close below the pot.

German Method to Grass a Lawn.—For each square rod to be planted take half a pound of lawn-grass seed and mix it intimately and thoroughly with 6 cubic feet of good dry garden earth and loam. This should be placed in a tub, and liquid manure diluted with about two-thirds of water added and well stirred in, so as to bring the whole to the consistency of mortar. The ground must be cleaned and made perfectly smooth, and then well watered, after which the paste just mentioned should be applied with a trowel, and made as even and thin as possible. Should it crack from exposure to the air, it must be again watered and smoothed up day by day until the grass makes its appearance, which will be in from eight to fourteen days, when the whole will soon be covered with a close carpet of green.—*Gardeners' Chronicle.*

American Agriculture.—The United States of America are estimated to grow annually 100,000,000 acres of grain and potatoes. Half this area produces Indian corn, fully one-fourth is under wheat, an eighth yields oats, while about 5,000,000 acres are divided among barley, rye, and potatoes. The aggregate value of these crops represents a grand total of about £225,000,000 sterling. Besides these breadstuffs, 25,000,000 acres are estimated to grow hay, the produce being 32,000,000 tons, while upwards of 12,000,000 acres are devoted to cotton, yielding nearly 5,000,000 bales. The milch cows of the States number 11,500,000, valued at £60,000,000 sterling. Of hogs there are 33,000,000, representing a total value of as many sovereigns. The value of the twelve months' agricultural exports stands at present at £105,000,000, and is 76 per cent of the total products.

The Shamrock.—One of the first questions for an Irish Parliament of naturalists and devotees of folk-lore to settle would be as to the identity of the true Shamrock. Is it Oxalis Acetosella? or is it the more prosaic Dutch Clover, *Trifolium repens*? We do not pretend to resolve the knotty problem which lends an interest to the lovely little wildling (Oxalis Acetosella); with delicate foliage, of a pleasantly acid taste, the tender blossoms, clear white veined with pink. Various species of Oxalis are in cultivation, for the genus is a large one, especially in South Africa, but not one among them is more beautiful, more refined in its loveliness than this little denizen of our woods and hedge-banks. In some counties it is called Gowk-meet. May no League ever arise to besmirch the tender grace of this flower, or extirpate it from our woods. Botanically it is a near ally of the wild Geranium.—*Gardeners' Chronicle.*

The Indian Forest School.—An impartial study of the recent report of this institution at Dehra Dun leads us to conclude that it cannot replace a similar school in Britain for the advancement of home and colonial forestry, as hinted by Mr. Gladstone in the recent debate. Founded on continental models, British common sense is modifying the curriculum for the specific needs of Indian pupils. Thus Sylviculture has been separated from the theoretical instruction of the lecture-room in Morphological and Physiological Botany, and is now taught practically in the forests; while Mr. Clifford's course of lectures on Entomology has been expanded so as to admit the study of all injuries and diseases incident to forest plants, whether by animals, insects, or other plants, such as climbers, epiphytes, parasites or fungi, as well as the decay and preservation of timber. This is now termed Forest Etiology. —*Journal of Forestry.*

Fighting Ants with Ants.—The negroes of Mauritius have an interesting way of disposing of the termites, or white ants, which destroy their houses, and everything of wood in the country. When they see the covered ways of the termites coming near a building, they drop a train of sirup from one of these ways to the nearest nest of black ants. Black ants are very fond of sweets, but still more fond of termites. The first ones that discover the sirup follow it up till they reach the termite passage, when they at once return to their nest and prepare for war. In a few hours a black army in endless columns leaves the home, and starts for the white-ant stronghold. With great fury they rush into the galleries, and soon entirely destroy their enemies; and each one, on its return home, carries a dead termite, probably to eat.

Stones and the Soil.—In some very stony localities, it is a popular belief that stones are in the process of formation, or as it is often expressed, "they grow." The fact is, instead of any increase of a stone from the surrounding soil, the action is in exactly the opposite direction. All of the soil, save the vegetable matters it contains, results from the disintegration, the breaking down and powdering, of solid rocks or stones. Changes of temperature, contracting and expanding them, break down stones. Rain penetrates the pores of rocks, and freezing in them, throws off small particles. Rain also dissolves some of the constituents of rocks, especially those largely, or in part, of lime-stone. Finally, plants aid in breaking up rocks into soil, by the action of their roots while growing. Also, when plants decay, various compounds, including acids, are produced, which act upon rocks and aid in reducing them

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to powder. Instead of there being anything like an increase in the size of rocks and stones, there are a number of agents silently, but ceaselessly at work, slowly converting them in to soil.—*American Agriculturist.*

Soot Water not only assists growth, but makes the foliage dark in colour and healthy. This is seen in a very striking way when soot is sown over Grass if a portion of a meadow happens to be missed, as the herbage on the part dressed will assume a rich green hue very different from that of the other. The same thing happens in the case of plants in pots, or fruit trees in the open, where one has it and the other is missed. Not only has soot water a very beneficial effect when given to the roots, but it is of great value for syringing, as it keeps insects in check without in any way doing harm to the leaves if quite clear when used. In order to have it clear, put the soot in a coarse canvas bag, and then sink it in a tank or tub of water, and there let it remain till the water is deeply stained, when it may be taken out, emptied away, and the bag dried ready for using for the same purpose again. Where soot water is required in large quantities it may be made by first mixing up the soot into a thick paste, and then putting it into a large tank, when, after a few weeks, it will settle to the bottom, leaving the water coloured, but clear, and if not, a little lime will soon make it so by helping to precipitate the soot; besides which the lime will make the liquid better for plants, except Heaths and Azaleas and such as are of a hard-wooded character.—S. D. in *The Garden.*

A new Vegetable—"*Choro Gi*".—We expect that every year will bring a number of new varieties of well-known vegetables. Indeed, it would be a poor year, if the English seed-growers did not give us at least half a dozen new peas or new names, but to have an entirely new vegetable added to the list, is something note-worthy. The fact that this novelty is offered by the house of world-wide fame—Vilmorin-Andrieux & Co., of Paris—indicates that the new plant has some merit. The plant in question is *Stachys affinis*, which is a native of Northern Africa; it belongs to the Mint Family, and, what is unusual in that family, produces fleshy, tuberous roots, which are the edible portion. The tubers are dressed like string-beans, or fried in the form of fritters, and are said to make an excellent pickle. When freshly dug the tubers are pearly white, but upon exposure to the air they become blackened, hence it is advised to dig them only as wanted for use, or if dug in advance, to keep them covered with earth. *Stachys affinis* is the botanical name, and we are given "Choro Gi" as a synonym, probably the name by which it is known in its native country. The plant is said to be very hardy, and to produce abundantly without special cultivation. Whether this will be a useful addition to our list of vegetables, can only be ascertained by trial in various parts of the country; at present, it looks as if it would be an amatuer's or "fancy" vegetable, rather than a regular crop for market.—*American Agriculturist.*

British Burmah and Rice.—The last Administration Report of British Burmah tells us that nearly ninety per cent (88) of the cultivated area in the province, is under paddy, the cultivation increasing steadily by more than 100,000 acres a year. Out of the 4,000,000 acres under tillage, 232,428 acres are fruit and vegetable gardens. "This kind of agriculture pays well, and that a ready market exists for all orchard and garden produce goes to support the view that the people of British Burmah are well off, and live comfortably." We have frequently pointed out that the calculations of our settlement officers are constantly vitiated by their uniform failure to take any account of the garden, fruit, and dairy produce of the ryot's holding. Whenever these holdings are in the neighbourhood of the cities which are growing up all over India, these items form a most valuable part of the produce, as we here read they do in Burmah. The report tells us that in most parts of the province, the land revenue amounts "to from one-twelfth to one-tenth of the value of the gross produce, and good markets are available directly the rice crop is harvested." The exports from the province are about £9,000,000 sterling a year, the chief items being:—

	£
Rice (paddy)	5,500,000
Catch and Gambier	370,000
Hides	160,000
Timber	1,600,000
Cotton	200,000

The gross land revenue is about £670,000 a year, but the addition thereto of a capitation tax of £300,000 a year, brings the assessments up to nearly £1,000,000 sterling. The general result is that the land bears an assessment of about two rupees and-a-half per acre, the State thus exacting a larger payment from the cultivator, than the so-called rack-rent levied by the zemindar in these provinces under the Permanent Settlement.—*Indian Agriculturist.*

Original Articles.

BULB GARDENING IN INDIA.

Liliums or Lilies.

Descriptive list of Varieties—(*continued from page* 269.)

The Golden-Rayed and Tiger Lilies.

Archælirion Group.

The flowers in this section are open and reflexed, horizontal or slightly drooping, and wide spreading. This group may without exaggeration be said to be composed of the cream of the whole family. It is sober fact and no exaggeration to call *Lilium auratum* the queen, *Lilium Tigrinum* the king, and *Lilium speciosum* the empress of all the Lilies.

L. auratum (*speciosum imperiale*) is held by botanists to be little more or better than a sub-species of *Lilium speciosum*, and it must be admitted that some varieties of it, especially those with most purple in the flower, run that species pretty closely. Be that as it may, it will be questioned by no one that *L. auratum* is the most magnificent flowering bulb in cultivation. How it came to be overlooked by previous collectors is one of those mysteries which it is somewhat difficult to solve. The Orientals have a strong wish to keep some of their best things to themselves, and these golden Lilies were, no doubt, thought too good for the outer barbarians. It was introduced by Messrs. Veitch of Chelsea, and flowered by them for the first time in 1862. It took the trade and cultivators as it were by storm, and has done more to popularise lily growing and create an enthusiasm for these flowers than all that has ever been said or written on their behalf. It was only necessary to look upon the beauty and enjoy the fragrance of this golden-rayed visitor from Japan to be smitten with the lily fever; another source of the captivating power of this lily lies in its endless sports and development into new forms. These are generally distinct and permanent, so that the grower of a goodly number of *L. auratum* may be said to grow a considerable collection of distinct sub-species or varieties, all springing from this one glorious species, the flowers differ so much in size, colour of rays, size, number and colour of spots, &c. The normal colour is white with a golden band down the centre of each petal, and numerous deep purple spots. In some flowers the band of colour is faint, in others vivid—wide in some—narrow in others; some flowers have few spots, others many; the colour of the spots run through all the changes of scarlet, purple, and rose in all their varieties of shades, and in one case at least, that of the pure white original variety of *L. auratum*, the spots are of a delicate pale primrose colour. The size of the flower is equally or more varied than these secondary characteristics; neither is the time of flowering at all constant—we have had some in flower in June and others right up to the end of September. Part of this wide difference was probably owing to culture, but under exactly the same conditions the difference in the time of flowering

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amounts to six weeks or two months, and it is thought that by noting the period of blooming of different bulbs, sets of early, mid season or late blooming varieties may yet be selected that will prove constant to their times of flowering. Most of the varieties of *L. auratum* reach a height of stem of about 3 ft, occasionally 4 ft. or more under good cultivation ; the leaves are spreading and scattered, amounting to from twenty to thirty at the time of flowering, the flowers vary from five to twenty ; the petals are from 5 in. to 7 in. long, and the finer flowers are from 9 in. to 12 in. across when fully expanded. The bulbs are globular, with yellowish scales, varying very much in size, being large and heavy in fine specimens.

The following are a few of the finer varieties of *L. auratum* offered by the trade :—

L. auratum virginale.—Pure white, with pale golden band and spots.

L. auratum diadem.—Fine and small bright pinky spots.

L. auratum macranthum.—Very large flower, richly marked.

L. auratum rubrum vittatum.—This magnificent variety is still scarce and dear, from 3 to 4 guineas each for fine bulbs. It has a band of rich scarlet continued up to the base of the petals, the spots are also of a rich red tint. The scarlet ray running through the white ground of this variety is simply magnificent.

L. speciosum (Lancifolium)—Is another modern Lily, being only introduced into Europe in 1832, under the name of *L. Lancifolium*, a name which it still retains in most gardens. This fine class of lilies is generally divided into two sections according to the colour of the stems.

The *L. speciosum rubrum* section has brownish stems, ranging to purplish black, the green of the foliage following the leaves, as it were, of the stems. *L. rubrum verum* has a purplish black stem.

The *L. speciosum roseum* section has brownish stems ranging to light green, and the shade of the foliage follows that of the stem. *Roseum verum* has a pale green stem

The plants attain a stature of 2 ft. to 3 ft. ; leaves from ten to twenty in number, and the flowers are from three to ten, arranged in a raceme or corylus ; the blooms are 3 in. to 4 in. deep, spreading to 6 in. across. The colour is a pure white ground in the species, profusely spotted and often suffused with claret or red, but the colour varies very much in different varieties of this beautiful, best known, and perhaps most generally grown of all the Japanese lilies. Of *L. speciosum rubrum* and its many varieties the following are the best :—

L speciosum rubrum album—pure white, is a universal favorite. The monstrosum or corymbiflorum is a grand variety of this pure white Lily.

L. speciosum rubrum præcox is an early flowering variety with pure white frosted looking blossoms.

L. speciosum rubrum verum is generally considered the typical form of the true *speciosum*. The pure white ground is thickly spotted and partially suffused with crimson ; the edges of the perianths being pure white : a very beautiful and noble variety.

L. speciosum rubrum fasciatum is very like *monstrosum* in form, pure white suffused and spotted with crimson, and one of the freest flowering varieties.

L. speciosum rubrum macranthum is a very large variety, pure white, richly and finely spotted with crimson. L. speciosum rubrum purpuratum (*atropurpureum*) is the deepest coloured and richest of the entire family—bright crimson, edged with white.

L. speciosum roseum is a free grower and most abundant bloomer, pure white ground, spotted and suffused with crimson. There are many varieties of *roseum* in the trade, the following being the most distinct :—

L. speciosum roseum album novum, pure white ; very beautiful.

L. speciosum roseum vestale, a large pure white variety ; one of the finest.

L. speciosum roseum verum, white suffused and spotted with rose.

L. speciosum roseum punctatum, rich frosted white, spotted with delicate pink, is a very distinct and beautiful lily. The fasciated from of this is still more floriferous. There are many more varieties offered by the trade, such as *grandiflorum, album, Japonicum, augustifolium, maculatum, pollidum, sanguineum, superbum, latifolium*, &c., but these are either rare or expensive, or very closely resemble those above noted.

Our last section of these horizontal or drooping flowered lilies is the Tigrinum section, or Tiger Lilies, so called from the number and size of their spots.

The most common variety of this beautiful Lily, *L. tigrinum sinensis*, was introduced from China in 1804. It is still the most generally cultivated both in pots and in the open air. This noble Lily grows to a height of 2 ft. to 4 ft. The stem is stout, purplish black, covered with a sort of cottony substance. Its dark glossy green leaves are scattered irregularly over the stem, and number from twenty to thirty when in flower. The flowers vary from five to fifteen, or even twenty in very luxuriant specimens, from 8 in. to 10 in. broad and 3 in. to 4 in. deep, the colour of the species being bright deep orange red, almost covered over with black, purplish spots, the colour of the flowers and spots varying, however, considerably as well as their form or rather position on the stems in different plants.

L. tigrinum pseudo-tigrinum for example has a cinnabar red brown colour, thickly dotted over with crimson spots.

L. tigrinum Fortunei is a noble and striking variety, the stem, which is more stately than in the species, rising to a height of four feet. The colour is a rich orange scarlet, spotted with dark crimson, almost black.

L. tigrinum Fortunei flore pleno is a grand double strain of the above, almost as double as a Camellia ; the flowers nearly six inches wide, rich scarlet with crimson spots. There are also two larger varieties of both these L. t. f. major and L. t. f. m. flore pleno which are similar in colour and form, the flowers being larger.

L. tigrinum splendens (*Leopoldii*) is the tallest of all the tiger lilies, growing to a height of six feet ; the colour is a brilliant orange scarlet, and the spots of crimson are of larger size than in the other varieties.

L. tigrinum præcox erecta (Masterii) is the earliest of all the tiger Lilies, and less revoluted than most of them.

L. tigrinum Japonica, the Japanese tiger lily, closely resembles the Chinese variety, but is somewhat taller.

L. tigrinum erectum has fewer spots than the majority of tiger lilies, and only grows to about 2½ft. in height.

L. tigrinum jucundum (Lishmanni) is a rare species, continuing in flower for a longer period than most of the others ; the colour cinnabar red, freely spotted.

Notholirion Group.

In the last group (*Notholirion*) there is at present only one Lily —*Thomsonianum Roseum* or *Fritillaria Thomsonianum*, an Indian Lily found in the Himalayas and supposed to have been introduced into England from Mussoorie in 1843 and flowered by the Messrs. Loddiges in 1844. Botanists have not yet decided whether it is a Fritillaria or a Lily, but it is anyhow a plant of great beauty. It has a truncated bulb about two inches thick and deep, enveloped in a loose grey or brownish coat reaching up to the neck of the bulbs. The leaves are crowded round the base of the stem, only a few mounting upwards ; flowers from twelve to eighteen in a raceme a foot or more in length, 3 in. or 4 in. broad when fully expanded, and two inches deep ; colour a beautiful rose-lilac, alogether a beautiful and striking plant.

THE INFLUENCE OF FLOWERS.

"How beautiful this oleander tree is looking. How many blooms? One, two, three—why, Mrs. Forrest, there are twelve of these lovely pink blossoms! What a faculty you have for making plants and flowers of all kinds grow, bud and bloom, in-doors and out."

"My dear friend, the 'faculty' is no secret ; a plain, daylight fact, open to every one who will notice and give heed."

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"But it takes lots of your time—it must—planting, potting, repotting, watering, changing, dusting, and the general fussing. Besides the litter and dirt even a few house plants make. I know they look pretty, pleasing to the eye, but aside from that, where's your pay?"

"Where is my pay?" and the woollen blouse Mrs. Forrest was making for one of her children, dropped upon her lap.

"I think, Mrs. Miller, I have noticed in your house many articles of handsome design and fine work done by yourself, which serve neither as food nor raiment, yet they are there in every room, filling their particular niche; how do *they* pay you?"

"Why—why, in the doing, to be sure, and the pleasure of possessing."

"Yesterday you could not attend the ladies' sewing meeting, because you were so interested in George Elliot's 'Romola,' that it must be finished before returning it to the library to-day. How did the reading of that book pay you?"

"Pay me? Oh Mrs. Forrest, if you were not looking so perfectly rational, I should say your mind was unsettled."

"Then you found compensation?"

"Yes, indeed!"

"What way?"

"Oh, I cannot tell that, unless you have read the book. If you have, you will understand the kind and amount."

"But I have never seen it."

"Then I cannot tell you."

"Ah! Then, to understand, one must know of the doctrine? It is the same with the cultivation of flowers: and yet, I think, I *can* tell some of the compensations, for there are many. First, they have grown beneath my fostering care, consequently their cheery leaves and smiling blossoms are satisfaction, and genuine satisfaction in almost any enterprise generally pays."

"But it takes so much time."

"True, I am not sure it could be better spent, for I have only begun the chapter of recompenses. Besides, in my own experience, I think fancy work takes time."

Mrs. Miller smiled, while Mrs. Forrest continued.

"Second, studying the names and characteristics of my floral friends, I find the circle of my knowledge enlarges. Many plants are natives of other countries, and their history oftentimes leads to the history, or a portion of it, of the country, and such knowledge many times tends to interesting conversations with friends acquainted with the same subjects. Oh, the avenues a love and knowledge of flowers open cannot easily be told! But to continue: There is the compensation of giving. A beautiful wreath or bouquet of flowers is an appropriate and pleasing gift on almost every occasion, and, to the truly appreciative, the pleasure of giving is greater than that of receiving. Almost everyone likes to handle and receive flowers. I remember a very little girl walked through my garden once when many flowers were in bloom. A more delighted child I never saw. With a shout of joy she exclaimed: 'The roses! the roses! oh, *see* the roses!' 'Roses' was to her the all-comprehensive name. I gave her a nice bunch, and I think I never beheld the face of a child lighted with greater happiness. The little girl possessed, in a large degree, the natural love of the truly beautiful, and this leads me to the closing portion of my text for this time—the cultivation of the beautiful."

"But, Mrs. Forrest, you are not an æsthetic. I never saw you with a sun-flower in your belt, or a lily-pad at your throat."

"Oh, no. Not an æsthetic in the least. I believe the verdict of my acquaintances would be, a plain, home-spun woman. Nevertheless, one of the greatest attractions to me, in the cultivation of flowers, is a growing love for the beautiful in myself and family. There is a natural refining influence in flowers that long contact will cause to react in some measure. Of course natures differ, but the Yankee instinct, 'will it pay?' arises in almost every phase of life, and when I see my boys growing daily more fond of 'mother's plants,' missing this one if removed, watching that one closely if beginning to droop, noticing the unfolding buds, eagerly waiting for the blooming, singling out the choice plants, and understanding why choice, noting their habits, studying their history, I know a taste for the beautiful is being formed which, if nurtured and cultivated, will ultimately lead to refinement of character, and I am convinced my time is well spent, and my amateur gardening a paying investment."

"A college student once told me it was interesting to notice the difference in effect between a vase of flowers and a spittoon of cigar stumps upon those who visited his room. The influence of these objects was, of course, silent, but he assured me it was there, and noticeable."

"Well Mrs. Forrest, you've made a good argument," as my husband would say, "and I must leave you now; but if you will please give me some slips from your plants, I believe, on your recommendation, I'll try the compensations."

"There are many facts connected with their habits, you must know, and the diligent seeker will be rewarded, I do assure you. 'To him that hath shall be given' you know, are the words of Scripture, and in the doing is the reward, and the striving rest. Think not too much of the recompense of the future; remember there are solid compensations to be seized each passing hour."—*Selected.*

THE FERTILIZATION OF ORCHIDS.*

(*Continued from page* 270)

Cypripedieæ.

The pollen of this tribe, unlike any yet mentioned, is perfectly free, representing a firmer and much simpler condition of the order. It is produced in two lateral anthers belonging to an inner series of three, and the separate grains are coated with viscid matter by which they are retained on the convex stigma. The pouch-shaped labellum is constructed so as to compel insects that enter by the large trap-like opening, to leave by two small lateral and basal openings, thus leading them over the concealed stigmatic disc and afterwards the anthers. The extreme base of the labellum internally and the base of the petals skirting the narrow openings are in many species densely bearded or beset with hairs, offering further obstruction to the egress of insects, except over the stigmas and anthers. In Cypripedium venustum the convex surface of the dry stigmatic disc is obsoletely papillose, but a fringe of distinct papillæ round the margin, doubtless, aids the retention of the viscid pollen grains. This condition applies very closely to many other if not all the species belonging to tropical Asia and the East Indies, as C. concolor, Godfroyæ, insigne, javanicum, Spicerianum and others of the same group. The same organ of the South American subgenus Selenipedium, including Uropedium, is distinctly papillose all over, in S. longiflorum, conchiferum, Roezli, and many others, thus furnishing another mark of distinction between them and Cypripedium proper, besides the three celled ovary and native country. The lateral sepals are completely united in these genera, forming a support to the labellum, except in Cypripedium arietinum, where they are almost free, representing a more primitive condition of the tribe.

Objects of Insect Visits.

We have no reason to suppose that insects are in the slightest degree conscious of the great benefit they bestow on Orchids by effecting cross fertilisation. The sole object of their visits is for their own material benefit, namely, food or a means of subsistence. The beautiful co-adaptations that exist between them and the flowers, not only satisfies temporal wants, but ensures the perpetuation of the Orchids, and future supplies of food to the progeny of insects. This food is of various kinds, the most obvious of which is nectar, generally produced at the base of the labellum, or in a spur forming part of that organ. It is also produced by the sepals as in Disa and others, in all of which cases it may be free; but in other cases, insects have to pierce the inner lining of the nectary to obtain it. The fleshy protuberance on the labellum of many Orchids are eaten by insects, and doubtless serve also as obstructions on

* A paper read by Mr. J. Fraser before the Birkbeck Students' Scientific Association.

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elevated platforms, causing visitors to brush against the rostellum. The idea of insects piercing or eating fleshy parts has been much discredited, but actual observation of the action sets the matter at rest, and a paper read before the Royal Microscopical Society, in April, 1874, describes the hardened and pointed proboscis of a moth from West Africa adapted for piercing and abstracting the juices of plants. The pollen is too precious, and nature too rigidly economical in this instance to favour the development by natural selection of pollen eating insects, seeing that not merely part of the pollen would be lost in this manner, but the beautiful mechanism to ensure the transportal of the rest would generally be destroyed. Insects also meet with serious difficulties in obtaining a livelihood, and must frequently be encumbered by pollinia, or the adhesive glands fixed to their proboscides, eyes, and other parts of the head. The pollinia of Catasetum are shot with considerable violence at visitors. In our hothouses, ants get glued to the stigmatic disk and die there.

Colour and Odour.

Colour is one if not the leading attraction that serves to allure insects from a distance, and in cases of high specialisation must lend material assistance in finding or recognising the species from which they expect to obtain food. In no other order, probably, do we find such a variety of colour, ranging from the primitive green through yellow, white, pink, red, scarlet, purple, and ultimately blue, as in Vanda cærulea (cærulescens), Calanthe natalensis and others. These by no means exhaust the number of shades and tints, while an enormous proportion are exquisitely variegated with several distinct colours—another instance of high colour development. The higher colours were developed from the primitive and simpler ones by natural selection. Insects in searching for food were attracted by those flowers that varied and rendered themselves more conspicuous. This colour variation merely served to direct insects to the flowers, and distinguished them from the ordinary vegetative portion of the plant. Excretory products being more generally produced by the floral organs than other parts, these colours became associated with a store of rich food for insects. Excretory substances outside the floral organs, being of little or no service to the process of fertilisation, and consequently reproduction would have little or no chance of preservation by selection.

The odour of flowers has a direct bearing on their fertilisation, and acts either in conjunction with or independently of attractive colours in drawing the attention of insects. Many species possess an odour, the exact counterfeit of that of some other plant, such as the Primrose, Violet, Cloves, Cinnamon, and others. No doubt all these are intimately associated with the insect or class of insects that visit the respective kinds, or, in other words, serve as a distinctive mark by which they may be recognised. Pleasing odours are mostly associated with more or less highly attractive colours; but Odontoglossum hastilabium and Cœlogyne fuliginosa have a positively disagreeable smell, and are, therefore, exceptions. Odontoglossum gloriosum, Cattleya aurea Dowiana, Epidendrum macrochilum, Stanhopea grandiflora, Maxillaria venusta, and a host of others have conspicuous, showy and deliciously fragrant flowers, so that they possess a double attraction. Species with fragrant and pale or white flowers would lay themselves open to fertilisation by night-flying moths. On the other hand, Acropera concolor, Oncidium bifrons, Eria flava, and some others are typical of a number with moderately conspicuous flowers, and a somewhat disagreeable odour, especially when the flowers are past their best. Bulbophyllum Careyanum has inconspicuous and positively fœtid flowers, which doubtless attract carrion flies, as the Sauromatums do in our hothouses, deceiving the flies, and causing them to lay their eggs there.

Pathfinders and Adaptations.

All parts of the flower are subservient to the process of fertilisation, and all adaptations that are in any way beneficial to the plant in this respect are developed by natural selection. By pathfinders is meant anything that serves to guide insects to the nectary, or the place where nectar is secreted, resulting, generally, in effecting cross-fertilisation. Colour is a prominent feature in this respect, and when the floral envelopes are parti-coloured or variegated, a concentration of colours takes place often on the upper half of the labellum (constituting the landing-place), and from thence it extends towards the nectary bands, streaks, or fine pencilled lines. Cattleyas of the C. labiata group are examples of this, and no better instance could be given than C. aurea Dowiana. Numerous instances of spots, blotches, or lines occur amongst Dendrobiums, Odontoglossums, Epidendrums, and others which would be too numerous to mention. The labellum of the highly-developed Vandas is either darker or altogether differently coloured to the sepals and petals. In Vanda cærulea it is a deeper blue than the sepals and petals, with three raised lines or ridges leading to the nectary, behind the orifice of which is a bright yellow spot surrounded with blue, and that again with white. There are seven distinct shades of colour in Oncidium leucochilum, five of which are concentrated on the labellum and column. The shape of the labellum itself probably serves as a guide in the largest number of species, speaking generally, and this shape is frequently assisted by ridges and furrows or raised plates, as in Cœlogyne, Lissochilus, Orchis pyramidalis, several species of Lælia, Bletia, and others. Ridges like these are serviceable to the guidance of night-flying moths in white flowers. Elevated disks and other peculiar obstructions are placed on the labellum of Phalænopsis, and a tongue-like process on that of Maxillaria, Lycaste, Scuticaria, Prominœa, and others. I cannot look upon all these as meaningless and useless processes, but as contrivances and adaptations for assisting or compelling visitors to effect fertilisation in a certain definite way.

The floral organs, or any one or more of them, may become adapted to suit the convenience of a class or kind of insects, or of one species only. This latter case is one of extreme specialisation, and is significant from the fact that such a species is on the high road to extinction. This is evident, seeing that if any species of Orchid is dependent on one species of insect for fertilisation, and, consequently, reproduction by seeds, its welfare is linked with that insect; and should circumstances become so unfavourable for the latter as to cause its extinction, the Orchid must either take to self-fertilisation or, failing that, become extinct also. The species of Angræcum, judging from the length of the nectary are all more or less highly specialised, requiring insects with a long proboscis to fertilise them. This is carried to an extreme in A. sesquipedale, and although the existence of a moth in Madagascar has not yet been discovered, and may never be discovered, with a proboscis long enough to reach the bottom of the nectary of 11 ins. or 12 ins., it need never disprove the existence now or at a former time of such a moth. The question arises how long the Angræcum could maintain itself by purely vegetative growth without reproduction by seeds, provided the moth were already extinct.

Catasetum offers another case of extreme specialisation, where many species are sexually differentiated, with a perfect stigma, and perfect pollinia on distinct individuals. They are so different in appearance that the older botanists described them under different genera. This being so, insects are indispensable for the transference of the pollinia from the staminate to the pistillate flower. The rostellum is greatly elongated, bifurcate, and highly sensitive, and when touched releases the viscid gland, when the elastic pedicel ejects the pollinia with great force, a phenomenon which occurs in no other genus. Large and strong insects only are able to effect fertilisation, offering a remarkable instance of co-

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adaptation between the animal and vegetable kingdoms. Insects have suffered the same modification as the Orchid; but time forbids its discussion here.

(*To be continued*).

SEASONABLE NOTES.

THE FLOWER GARDEN.

CHRYSANTHEMUMS.—The plants of all the sections should now be in their blooming pots; and the plants that are required to produce large specimens should be trained into shape while the growths are pliable. English growers, as a rule, tie them down very close to make dwarf specimens, but they are often trained down so very close as to be quite deformed when blooming time arrives. It is best to study the natural habit of the plant, and to tie and train the growths as near as possible to that, and not in the form of an old-fashioned watch face or mole-hill. The pompons form a dwarf branching bush, and the large flowered section grow 3 ft. or 4 ft. high when well managed. But if they suffer from want of water, or are placed too close together, the lower leaves fall off and the whole plant becomes unsightly. There must be no stopping of the growths after this, otherwise the blooms produced will be weak and small. See that the plants are perfectly free from green-fly at the time of repotting; we destroy it at this season by dipping the tips of the shoots in a strong decoction of soap and tobacco water. Plants are greatly helped by tying out the shoots so as to admit of a free circulation of air; attention also must be given to their being liberally supplied with water should any break occur in the rains.

REMOVAL OF WEEDS.—The late rains have produced a prolific crop of seed weeds, both in walks and borders, and attention should at once be directed to their eradication before they obtain a firm hold and become unsightly and difficult of removal. In the case of those in beds or borders, the Dutch hoe is the best implement to use at this season for their destruction, as it disturbs but little soil and leaves the weeds scattered on the surface, where a few hours' drying wind or sun makes the raking of them off an easy matter, involving but little time and labour. With those on walks there is no way so effective as pulling them up by hand, the best time for which operation is immediately after rain, as then they can the more readily be lifted, and the walks can the more easily be smoothed down and rendered firm again by running the roller over them. Where salt can be used without injury to the edgings, as it may be where the walls are margined with grass, it is an easy matter to keep them free from weeds altogether by applying a very slight dressing about twice a year, but this should be done when the weather is settled, as a heavy rain just after using it would wash it away to the sides and cause damage to the verges. It is well to observe that if any portion of the garden, however small, be allowed to become a nursery for weeds, the seeds will be scattered by the wind in all directions, and will cause endless trouble afterwards, whilst the pleasure derived from the appearance alone of an orderly, well-kept garden is worth consideration and all the care that can be bestowed upon it. A clean garden, where every operation is carried out as soon as it requires attention, takes much less labour in the aggregate than one where things are constantly behind, and in the operation of weeding this is more than usually apparent.

PRESERVATION OF LAWNS.—Next in importance to sound walks is a level well-managed green sward, not level in the strict sense of the word, but without hills and holes or other irregularities that cause such a disfigurement and are so offensive to the eye. Where such imperfections exist, it is now a good time to rectify them, as the rain we have had has softened the ground, and will greatly facilitate the operation of cutting the turf to raise or depress it as may be necessary to obliterate the inequalities of the surface. By completing such work early the grass will have sufficient time to get well established, and will then stand the dry season without becoming scorched, and showing unsightly patches as it would if deferred till a later period. All weeds are sure to shew themselves in lawns after an abundance of rain, and attention should at once be turned to eradicate them as soon as possible, that their places may be occupied by the natural grasses. It is only by incessantly waging war with these that a rich, velvetty turf can be secured, for if left only for a single season, they spread at a rapid rate by means of the ready way they both seed and send out offsets. So much rain has now rendered lawns in a soft, spongy state, and advantage should be taken of this condition to get them well-rolled down, which will not only add to their present appearance, but will greatly improve the texture and quality of the grass and make it more easy to cut by machine. Worms also are sure to force their way to the surface, which causes much disfigurement and entails a considerable amount of labour to keep lawns in decent order; and to save annoyance in the future from them, it is a good plan to give a dose or two of lime water which will quickly bring them out, when they can be swept away or picked up and destroyed. Clear lime water may be made by mixing a bushel of lime with 150 gallons of water, and if this is poured on the lawn quickly through a rose watering pot after rain the worms will soon come to the surface.

ROSES.—These may be successfully budded throughout the month, the earlier however it is done the better, as the bark will now rise more freely than it will at a later period. Cuttings of Rose Edouard, China Roses, Devoniensis and the other varieties of Tea-Scented Roses should be put in at once.

PROPAGATION.—The propagation of foliage and flowering plants shoulds be pushed forward as rapidly as possible. As a rule, it is advisable to have all cuttings inserted by the end of the present month; this will give the young plants time to become well established before the cold season sets in.

VEGETABLE GARDEN.

SEEDS.—As the sowing season is fast approaching, lose no time in procuring a supply of seeds, in order that they may be at hand when wanted. Good seeds rather than cheap ones should be sought after, as a good seed-bed is invariably the precursor of a good crop. As to the variety of each kind of vegetable best worth growing, amongst the many varieties and synonyms of recent years it is somewhat difficult to decide. We shall however, as occasion requires, name those that in our own experience have proved the most valuable.

SOILS—Of a stiff adhesive character should be put up in ridges in the roughest manner possible, in order that the exposure to rain and air may effectually pulverise it. Even on light soils this is necessary as a means of exterminating the numerous pests concealed beneath the surface. Previous to turning up soils that have been long under crops, a liberal dressing of manure should be applied; given now this will prove much more advantageous than if used at the time of planting or sowing. Not necessarily very rich, but deep culture is essentially required for most kinds of vegetables, deep culture enabling them to withstand drought better than all the manure that can be used Trenching therefore should not be done grudgingly, as the little extra labour now required in performing it will be repaid with interest during the coming season—first, by much less watering being needed, secondly, by less weeding and hoeing being necessary, and lastly, by the growth of more succulent and sweeter vegetables.

ROTATION OF CROPS.—A systematic rotation of crops should if possible be adopted in every kitchen garden, especially where manure is scarce, in order that the first or direct supply of it may be given to such vegetables as require the richest food: for this reason a rough plan should be prepared showing with what each plot of land has been planted during the past year and indicating the rotation for the coming season. The plan should be drawn to a scale, in order that there may be no difficulty in determining the exact position of each crop, even though removed. It is necessary not only that plenty of everything should be provided, but that there should be no waste, and there is scarcely anything that better repays personal supervision than the gathering of

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vegetables if a good supply be aimed at. If there is a good supply of manure, too much stress need not be laid upon the rigid carrying out of any given rotation: still it is desirable to avoid, as far as possible, planting the same kind of crop two years in succession on the same land. This is a question however that hinges very much on the manure supply and its intelligent application. When a garden has to be heavily and constantly cropped, deep culture and heavy manuring must make up for any breach of the recognised system of rotation.

As a rule, where much has been taken out of the land much be returned to it. All lands intended for root crops next season should be manured, and if it is necessary deeply trenched as soon as it can be conveniently done, either by throwing the soil up into ridges or at least leaving the surface as much exposed to the action of the weather as possible.

CELERY.—Seed may now be sown in pans or boxes; the soil should be of a fine sandy description, so that when the plants are ready for pricking out, this can be done without injuring the roots, which would occur if it were lumpy and strong, thereby causing a check.

ASPARAGUS.—It is advisable to discontinue cutting by the middle of this month, as it is very important that the plants have sufficient time to make a good growth in order that the buds for the ensuing season may be matured. Seed may now be sown for the planting of new beds where necessary.

LONDON OFFICE

OF

THE INDIAN GARDENER,

D. J. KEYMER & CO.,

EAST INDIA AGENTS,

1, Whitefriars Street, London, E. C.

Correspondence.

TO THE EDITOR OF THE "INDIAN GARDENER."

DEAR SIR,—Will you kindly inform me through the columns of your paper to within what distance from the soil surface Rose plants should be pruned. Where there are branches both of matured and immatured wood, is it advisable to cut away the former to make room for the latter, or *vice-versa*.

Will you also give a few general instructions as to the management of a small forcing frame, for the striking of Rose, Croton, and other cuttings, mentioning the position in which it should be placed with regard to sunshine and shade; the best compost for striking, and if it is advisable to keep the frame continually closed or occasionally to open it for ventilation.

Yours faithfully,

"KANDAUGYER."

NOTE I.—It is impossible to draw any hard and fast line as to the extent Roses should be pruned, so much depends not only on the class to which the plants belong but frequently also the particular variety; take for instance the great Hybrid Perpetual class, amongst these, there are plants of all degrees of vigour, some making wood almost strong enough and long enough for fishing rods, others rarely producing shoots more than a foot or so in length. A standard rule in pruning Roses is, that it should be carried out in the inverse ratio to the plant's growth—that is, that the stronger a plant grows the less pruning it will require, and the weaker the plant the more should the knife be used. Then again much depends on the object we have in view, if we are desirous of increasing the size and vigour of the plants we must prune sharply. But supposing plants to be well established and wood properly ripened and flowers the object aimed at, if we require quantity we must prune lightly, but if we want quality, that is extra sized flowers, we must cut sharply back. Then again as to the class of wood that should be left, if the previous season's growth is strong, plump and well ripened, we should depend entirely on this, for it invariably produces the finest blooms; but supposing these to be sappy or immatured, we should take say the three strongest of these, and the three best two-year-old shoots the buds of which should be dormant, the former should be cut back to four or five eyes, the latter pruned lightly, and for the following reasons: the new wood is retained to produce vigorous growth for the following season, the older wood to produce flowers; if we depended entirely on old wood our plants would suffer, as it invariably breaks weakly—(see Vol. I., page 240).

II. We prefer a span roof frame to any other for forcing, a useful size is 6′×4, the sides say 18 in. high and roof 30 in. at centre, with the sides and ends also of glass, both sides of the roof opening on hinges; the frame should run from east to west and be placed on brick-work about eighteen inches high, the inside should be filled with about 9 inches of coarsely broken brick, then a layer of 3 inches of charcoal, and over this a layer of moss or cocoa fibre to prevent the compost being washed downwards, it is then filled up with whatever material is required for the cuttings; and this varies considerably Crotons, Eranthemums, Panax, Aralias and many other foliage plants do best in coarse silver or river sand (previously thoroughly cleansed from all impurities). Roses require a light sandy soil, and Draceenas do well in cocoa fibre refuse. Ventilation also depends greatly on the subjects operated on; as a rule, however, for the first few days after cuttings are inserted, they should be kept very close, lifting one flap of the frame about an inch for an hour in the morning is generally sufficient; as soon as the cuttings callus more air should be given. A moveable canvas screen should be arranged at a height of about 12 inches above the glass, so that the cuttings may be shaded from all direct sunshine, but fully exposed to light at all other times.—ED., *I. G.*

NOTICE TO CORRESPONDENTS.

All matter intended for publication, and all questions to be replied to should be sent in not later than the Friday previous to the day of publication. All communications should be written on one side of the paper only. It is also requested that correspondents forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication that is not accompanied by the name and address of the writer.

Extracts.

ON POTTING PLANTS.

Among the first-learnt operations in plant cultivation, crocking pots and potting plants are, to a young beginner, two of the most important. As garden boys we were first taught how a pot intended to contain a plant should be drained, and in due time we were allowed to take our place at the potting bench, when in our own opinion we were fully fledged gardeners. To a man whose apprenticeship was spent under a good and careful master, by whom all that it was important for the beginner to know with regard to potting and such elementary work was carefully explained at the outset, a chapter on such a subject will be of little value, and he may justly remark on seeing this that he and all properly trained gardeners have learned long ago all there is to know about potting. But unfortunately, there are not a

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few men who, from one cause or another, have not been properly grounded in the operation of potting, and that it is so every gardener finds out often to his cost. Recently at a meeting of a gardeners' society, of which the writer is a member, the chapter in Lindley's "Theory of Horticulture," which treats on potting, was read and discussed ; and although everyone seemed to think he knew how to pot a plant properly, much was said that showed how some at least did not rightly comprehend the operation, whilst one or two supported views which if acted upon could not but result in disastrous consequences. This, therefore, is the excuse for writing a chapter upon the subject.

Some useful advice was given by Mr. Muir at page 232 on how to drain flower pots ; but one or two flaws occur in what he has said—notably where he suggests that an inverted pot should be placed over the hole in the bottom of large pots. Now we all know that the first object to be attained by drainage is a free and constant outlet for the water from the soil above, and thus it is that where crocks only are used we are always careful to place over the hole at bottom of the pot a large one with the concave side downwards. But a small even-rimmed pot placed over the hole is practically the same as placing a flat crock or a piece of glass over it. This will be apparent to anyone who observes how closely the rim of a small pot, when inverted over a flat surface, will touch all round. By breaking a few nitches in the rim of the small pot to be used as drainage the danger of blocking the hole of the pot drained is obviated. In Lindley's book an excellent plan is mentioned for preventing worms, &c., getting into the pot through the hole at the bottom when placed upon the ground. He says, "To remedy this I put at the bottom a piece of perforated zinc so as to completely cover the hole. Upon this a large crock is placed with the convex side upwards." For large plants which are stood out of doors during a portion of the year this zinc trap seems an excellent suggestion.

The depth of drainage used always varies with the requirements of the plant—orchids and a few other plants, generally epiphytal ones, requiring a larger amount of drainage than others. Bearing in mind that for plants which are intended to remain in the same pot for several years the more drainage used the less soil room there is, it will be seen that a thin layer of crocks properly placed will be better than a thick one. The roots of a plant when growing in a pot very soon reach the bottom, where they generally continue growing round, and seldom—with strong-rooted plants never—find their way back into the soil again. Where a thick layer of crocks is used it will be seen that the majority of the feeding roots have no food supplied them other than that contained in the water when passing through the soil and crocks. Where crushed bones are used as drainage the case is different, as the bones afford more nourishment to the roots than ordinary soil would. If a shallow layer of soil is preferred it is always advantageous to use shallow pots or pans instead of having a deep layer of drainage beneath the soil, which has the effect of allowing the water to escape from the soil quicker than is good for the plant. So long as stagnation is prevented it is better for all terrestrial plants that they be so situated as to have the soil about their roots kept moist without too frequent waterings, the effect of which is to completely decompose the soil or make it sour. For plants in very warm houses this precaution is of special importance

Shifting plants into pots of larger size is an operation requiring some knowledge of the nature of the plants, and also depends not a little on the health and size of each. Considering first those plants which are slow growers, and therefore do not extend their roots very far in a year, such as Ericas, Epacrises, Pimeleas and other hard-wooded plants, the question arises, is it better to treat these plants on the one-shift system, as recommended by Dr. Lindley, or to give them repeated shifts, such as would be no more than the roots would take complete possession of in a year? If it is admitted that the soil deteriorates rapidly when frequently watered or when placed in heat, it must be apparent that to place a plant in a large body of soil which could not be occupied by the roots for several years is a system not to be recommended. There can be no question of the many advantages of the repeated or gradually increasing shift over that of the one-shift system —that is for plants which are being grown from small into large specimens, and which are slow growers. Many plants—such, for instance, as Pelargoniums, Balsams, Fuchsias, &c.—will under favourable treatment grow to a very large size in a single season. Some of the soft wooded quick-growing heaths also considerably increase in size in a year : for all such plants a much larger pot is advantageous. But we must remember that with very few exceptions the plants we grow are wanted to flower every year. Now it is a well known fact that under ordinary conditions a plant in a pot of proper size—i.e., such as its roots would about fill in a year—flowers more freely than when planted out, or when grown in a larger pot than is required for one season's growth. The pot cramps the roots, causes the wood to mature quickly, and so induces the plant to flower. We know that the smaller the pot under ordinary conditions the greater the disposition to flower, so that by placing our plants in pots containing only enough soil to afford them the conditions required for the growth and maturation of the wood formed in one season, we are ensured a supply of flowers which would probably otherwise have failed us. From this it will be seen that the safest and best system to adopt with regard to repotting and shifting is the annual and not the one-shift system, or, in other words, the placing of the plant at an early stage of its growth in a pot large enough to contain it for the following six or eight years.

Shifting plants is a different operation from that of shaking out and repotting, which is practised only for such plants as are deciduous or require a long season of complete rest. This operation is usually performed after the plants have been rested, cut back, or pruned, and started into growth again. As soon as the buds begin to show signs of activity is the time to shake out from the roots of the plants all the old soil and prune the roots somewhat, afterwards placing them in pots of a size only large enough to afford them support for a few weeks. Whatever may be said to the contrary, there can be no question as to the wisdom of this method as compared with that sometimes recommended, and which is to repot the plants during their rest and not before growth has recommenced. A little consideration of one of the simplest laws of plant physiology is sufficient to condemn the latter practice. (It must be borne in mind that we are now discussing plants cultivated in pots, which afford conditions very different from those to which plants growing naturally are exposed)

The firmness of the soil is another point of some importance to the cultivator of plants in pots Some growers, successful ones too, pot the softest wooded and quickest growing plants much firmer than many would advise. Some of the best Pelargoniums I have ever seen were grown in a stiff loam pressed down as hard as a brick. These plants were in rather small pots, but it was a revelation to one who had been taught to pot hard wooded plants very firmly and soft-wooded plants loosely. A prize Mignonette grower used to say his success was due to hard potting and bones, and his plants were in soil as hard almost as stone. They were bush and standard Mignonettes, such as we seldom see now. In this matter, however, much depends on the quality of the soil and the aim of the cultivator ; still, the following general rules may be pointed to—viz., all fine-rooted plants may be potted firmly (always excepting annuals), very fine-rooted plants with hard wood requiring the soil to be rammed hard. The harder the soil is pressed about the roots the more sand or its equivalent should be mixed with the soil. For the production of flowers firm potting is an important fact; for foliage and quick growth loose potting is best.

In conclusion, a word of warning may be uttered against filling the pots too full of soil, so that insufficient room is left for watering. The more soil a pot contains the more water will be required to thoroughly moisten it when dry. This seems plain enough, but, as was said by one of those who took part in the discussion above referred to, "All these simple matters are plain enough, but many gardeners fail to see the importance of observing them. We all know how to pot a plant perhaps, but we do not all pot it properly."—*W. N.—Journal of Horticulture.*

THE EDIBLE FUNGUS OF NEW ZEALAND.

A fungus, the export value of which has reached to over £6000 in one year and over £11,000 in another, must be deemed a matter of sufficient importance to be worthy a note. A New Zealand correspondent kindly furnishes us with samples of the fungus, Hirneola polytricha a near relative of the common Jew's-ear fungus of this country, together with some notes of Mr. Griffin, the American Consul at Auckland, from which we extract the following :—

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"The New Zealand fungus known to commerce is found upon various kinds of decayed timber in the North Island, in what are called new bush settlements. It favours damp localities, and is very plentiful on the East Coast, south of the East Cape. It exists, however, in the greatest abundance in the province of Taranaki. This province is about 80 miles long and 70 broad. It is bounded on the north by the river Mokau, on the west and south by the sea, and on the east by a straight line from the mouth of the Patea river to a bend in the Wanganui river, and by another straight line connecting the latter river with the source of the Mokau river. Within this region are the vast forests: indeed, not more than one tenth of the entire province is composed of open land. The process of clearing the ground is very slow. The settlers often find their task so difficult that they abandon their work in one place and begin again in another. They lop off the branches of the trees and burn them, leaving the logs upon the ground, and as they are not removed soon begin to decay. The trees are well supplied with spurs, and fall in such a way as to partially rest upon them within a few feet of the ground. Sometimes the workmen erect scaffolds for the trees to fall upon. It is supposed that the growth of fungus is favoured by the trees being left in this way; it is more probable, however, that some peculiarity of the climate has more to do with its growth than anything else. It requires very little trouble and no expense to prepare this valuable article of commerce for the market; indeed, the only thing necessary to do is to gather it, and spread it out on the ground in the open air, or under sheds to dry. I know a number of children who keep themselves in pocket-money by collecting it, and they have no difficulty in telling it from obnoxious and poisonous plants of similar growth. Very few men, except those of idle and dissipated habits, engage in the employment of collecting fungus, unless I except the Maoris (or native inhabitants), who do not consider that occupation beneath their dignity. The fungus collected by the natives is generally dried in smoky huts, and is, on that account, nothing like as valuable as that prepared by the children of Europeans. As soon as it is dried it is put in Flax baskets or jute bags, and sold to the dealer for what it will bring. It is then packed in bales and shipped to China by way of Sydney or San Francisco. Some of it goes direct to San Francisco, where it is either transhipped to Hong Kong, or consumed by the Chinese population of our Pacific coast. At one time the profit upon fungus was something enormous, and it could be bought from the collectors at little more than 1 cent per pound, and sold in San Francisco at 15 cents per pound, and 23 cents in Hong Kong; the prices, however, are fluctuating. Now that its market value has become better known it is difficult to purchase it here, even in small lots, from the collectors for less than 8 to 10 cents per pound. It loses rapidly in weight by shrinkage.

"THE USES IN CHINA."

"In 1873 the Government of New Zealand caused an inquiry to be made as to the purpose for which fungus is used in China, and some correspondence was had between the Colonial Secretary of New Zealand and the Colonial Secretary at Hong Kong. The latter stated in one of his communications that the article was much prized by the Chinese community as a medicine, administered in the shape of a decoction to purify the blood, and was also used on fast days with a mixture of vermicelli and bean curd, instead of animal food. It is also said to be used in China and Japan for making a valuable dye for silks. Since this correspondence it has been discovered that it is used by the Chinese principally as an article of food. It forms the chief ingredient of their favourite soup, for which dish it is much prized on account of its gelatinous properties and its rich and delicious flavour. I send by this mail to the Department of State a small package of samples of fungus marked H, kindly furnished me by H. B. Morton, Esq., of this city, for examination and experiment. Mr. T. F. Cheeseman, the curator of the Auckland Museum, is of the opinion that the fragments of wood attached to one of the specimens is from a tree known to the Maories as Whau-whau-paku, or to botanists as Panax arboreum. The other specimens were doubtless found on the Karaka tree (Corynocarpus lævigatus), or the Maboe (Melicytus ramiflorus), Kaiwhiria (Hedycarya dentata), Pubapuka (Brachyglottis repanda), and the Panax arboreum already mentioned as well as on several other soft-wooded trees. Fungus appears to me to have a slightly pungent taste, although it is generally said to be tasteless. A few days ago I made soup out of some of the samples furnished me, but did not partake of it in sufficient quantities to be able to judge of its excellence as an article of food for civilised people; but one of my Chinese neighbours, who happened to be passing my door while the soup was boiling, caught the aroma of it, and very kindly relieved me of any further trouble in trying to cultivate a taste for one of his favourite national dishes.

"The following table shows the quantity and value of fungus exported from New Zealand for each year since 1872:—

Year.	Tons.	Value.	Year.	Tons.	Value.
1872	58	£1,927	1877	220	£11,318
1873	95	1,195	1878	173	8,652
1874	118	6,226	1879	59	2,142
1875	112	5,740	1880	155	6,227
1876	132	6,224			

Gardeners' Chronicle.

PINE CULTIVATION IN JAMAICA.

Successful Pine-apple cultivation in Jamaica, although at present on a small scale, is now an accomplished fact. On taking a general view of the suitability of the different elevations for Pine culture, the plains on the south side of the island are found to possess many advantages, which cannot be obtained in other situations of greater height. The soil required for their growth is best described as a sandy loam, containing quantities of decaying fibrous material. This is to be found on many of the estates situated in the Liguanea plains near Kingston, on parts of them called 'ruinate," or lands long since abandoned, and now covered with bush scrub, and native grasses. It is not intended to convey the idea that Pines will only do well in the class of soil indicated, for the Pine-apple is very accommodating in this respect, and will grow in soils of nearly opposite character, and produce good fruit; but for the general purposes of extensive cultivation the kind mentioned is, I think, the best, and Pines can be grown in it equal in size and flavour to any in the world.

The principal varieties cultivated are the Black Jamaica and the Ripley, which latter is of as fine a flavour as any in cultivation. It is said to have been introduced into Jamaica from Antigua, and there are two varieties of it (one of which I have lately found can be produced from the other, and *vice versâ*.) The first is of very much darker colour and resembles the Black Antigua, while the other or lighter coloured variety is well known to English growers as the Ripley Queen; Charlotte Rothschild, Queen, Monserrat, and two varieties called locally "Sugar Loaf" and "Cow Boy," are also grown. Fruit of Charlotte Rothschild has recently been produced weighing 10 lb., without any special cultivation. The varieties to be cultivated have to be determined by the market for which they are intended, but for general purposes the Ripley and Black Jamaica answer best. The quality of Jamaica Pine-apples is now, however, becoming known in many foreign markets, and there is a gradual though small increase in the demand for them.

In planting the following method has been found very successful. The ground intended for planting is cleared of all surface accumulation, consisting of grasses, weeds, &c., which is arranged in rows 4 feet from centre to centre; these, when covered with earth from the interspaces sufficient to form a ridge 1 foot above the surface, are allowed to settle for a time to consolidate and allow the rankest of the weeds to decay in some measure. Suckers are then selected, which should be of good size, viz., about as large as a half-grown fruiting plant in English hothouses, and having had a few of their lower leaves removed, to give the rootlets in their axils ready access to the soils, they are placed in holes on the top of the ridges, 2 feet apart, and rammed firmly down with a wooden rammer, leaving a small basin-like cavity at the base of each stem to hold water sufficient to render the ground solid, and fix them firmly in their places. Water once or twice at the most is only necessary, except in cases of exceptional drought. Planting may be done at any time, but the most favourable periods are January and October, provided the weather is not too wet.

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The fruiting season commences in April and May and ends in November; where, however, large breadths of Pines are planted they are never out of season the year round. It is found that after a season of wet weather those fruit nearest maturity are liable to become black or acid in their centre, even before the process of coloration begins. This will perhaps throw some light on the cause of the same fact occurring with British growers. It is also found that the more a fruit is shaded, or surrounded closely by its own leaves the better the Pine colours; should the Pine happen to fall out of its vertical position it is often scorched, by the direct rays of the sun falling on it when covered with moisture.

It is to be regretted that more attention is not paid to the cultivation of this article of luxury in the island, for if well conducted nothing pays better. I know of no piece of ground larger than 2 acres in one lot exclusively devoted to their culture, and yet off one acre this year, within 6 miles of Kingston, the return has been £80 sterling clear of expenses—the owner having sold many in the home, but his principal sales going to the New York markets. Pine-apples can be grown here and sold at a good profit for 4*d* each, weighing from 2lb. to 4lb. It is puzzling to find that with such great facilities, given by the good steam communication now obtainable, for disposal of the produce, more has not been done in way of exporting this fruit, both in the fresh and also in the preserved state. No company at present exists in the island for preserving the fruit, the small attempts which have been made from time to time by private individuals meeting with but little success from the desultory way in which the business has been conducted. This, now one of the minor products of Jamaica, would, if sufficient capital, energy, and perseverance were brought to bear upon it, become one of the staple articles of export.—*Gardeners' Chronicle.*

COLLECTING ODONTOGLOSSUMS.

"Although the geographical range of Odontoglossum crispum is comparatively limited, there is a marked difference in the varieties found in various localities. The Pacho Mountains is the home of the finest forms, and here plants grow on the lower branches of the forest trees in company with O. gloriosum and O. Lindleyanum, two inferior species in point of beauty, but which have, perhaps, in a great measure, been instrumental in producing the beautiful narrow petaled supposed hybrids, such as Andersonianum, Ruckerianum, Jenningsianum, and others. It is peculiar that, whereas the starry-flowered forms, similar to Lindley's type specimen, abound exclusively on the north of Bogota, the woods on the south, about ten days' journey distant, are rich in the fine round-flowered varieties. Although this Orchid is imported in larger numbers than any other from South America, the risk and expenses are not slight even now. In our case, we purchase the exclusive right to collect plants in the woods in certain districts; natives are employed to gather them, for which purpose parties of from four to eight go into the woods, returning in about a fortnight with the result of their labours. After the plants have been cleaned and prepared, and kept on wooden stages for several weeks, they are ready for packing.

They are then fastened to stout sticks, and these are fixed in wooden boxes so as to leave air space around them. The cases are carried on mule-back to Bogota, a journey of about ten days, and here they are received by an agent, who sends them by mules to Honda, which is reached in another six days. This place is situated on the river Magdalena, and here the cases are put on board a river steamer, which takes them to the seaport town of Savanilla, a journey occupying about five days. Owing to the intense heat on the river journey the plants often perish. The cases then come, as a rule, by mail steamer, *vid* Colon and St. Thomas, to England; the passage being made in about twenty-seven days. The risks, therefore, of importing this Orchid are great, and, owing to the peculiarly soft nature of the plants, they are so liable to decay, that in some instances seven-eighths of the consignment are dead on arrival here. The havoc made in the native forests, too, must be considerable, for we calculate that for every three plants actually established in European gardens a tree has been felled."—*Reichenbachia.*

AMERICAN VEGETABLE SEEDS.

It is a well known fact that many kinds of Vegetables are cultivated in America to a much higher degree of perfection than in any other country in the world, and foremost amongst these must be placed Cabbages and Tomatoes.

By the next mail steamer we shall receive a trial shipment of the following splendid varieties of the above from the celebrated seed grower Mr. J. J. H. Gregory, Marblehead, Massachusetts, and for which we are now registering orders. The descriptions given are those of the raiser.

CABBAGES.

The Stone-mason Cabbage—This cabbage is distinguished for its reliability for heading, the size, hardiness and quality of the heads. Under proper cultivation nearly every plant on an acre will make a marketable head; the heads vary in weight from nine to over twenty pounds, depending on the soil and cultivation.—Price per pkt. As. 0-8; per oz. Rs. 1-8.

Marblehead Mammoth Cabbage.—This is, without doubt, the largest variety of the Cabbage family in the world, being the result of extreme high culture. I have had heads, when stripped of all waste leaves, that could not be got into a two bushel basket, having a diameter two inches greater! In a former circular I quoted from persons residing in fourteen States and Territories, and also in the Canadas, East and West, expressing their great satisfaction with the Stone-Mason and the Marblehead Mammoth Cabbages, in their great reliability for heading, the size, sweetness and tenderness of the heads. They had succeeded in growing the Mammoth to the weight of thirty and forty pounds, and in some instances upwards of ninety pounds.

In a competition held last season in America, the first prize Cabbage of this variety weighed ninety-two pounds.—Price per pkt. As. 0-8; per oz. Rs. 1-8.

The Warren Cabbage.—A variety of recent introduction; it makes a head deep, round, and very hard, the outer leaves wrapping it over very handsomely. In reliability for heading no Cabbage surpasses it. Under ordinary cultivation the heads average 10 to 12 inches in diameter.

In the competition above referred to, the first prize specimen of this variety weighed seventy-five pounds.—Price per pkt. As. 8; per oz. Rs. 1-8.

TOMATOES.

Tomato, "The Favorite."—This variety possesses several advantages over any other, it is smoother than the "Paragon," and never hollow late in the season. Does not crack after ripening like the "Acme," is of a darker red than the "Perfection," and is larger than either; it has very few seeds, is ripe all through at once, and is very productive.—Price per packet As. 8; per oz. Rs. 2.

Tomato, "Canada Victor."—A symmetrical and handsome variety, in ripening it has no green left round the stem (a great fault with many kinds otherwise good.) It is heavy, full meated and rich, between round and oval in shape, and red in colour; it will be found to excel most varieties in that most desirable characteristic,—in earliness in ripening the great bulk of the crop.—Price per packet As. 8; per oz. Rs. 2.

Yellow Victor.—A beautiful medium-sized bright golden yellow variety, almost perfection in shape, a great improvement on "Greengage and other yellow varieties—Price per packet As. 8; per oz. Rs. 2.

Tomato, New Red Apple.—A new very large, round, solid variety, of brilliant colour and fine quality; one of the largest varieties in cultivation.—Price per packet As. 8; per oz. Rs. 2.

A collection of 1 packet each of the above seven varieties for Rupees Three only, or 1 oz. of each for Rs. 10.

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